BIOLOGICAL EVALUATION

FOR THE

Eiler Fire Salvage and Restoration Project

Hat Creek Ranger District
Lassen National Forest

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I. INTRODUCTION

The proposed activities considered in the Environmental Assessment (EA) for the Eiler Fire Salvage and Restoration Project (hereinafter Eiler Project) on the Eagle Lake Ranger District require a Biological Evaluation (BE) to be completed (FSM 2672.4). The BE process (FSM 2672.43) is intended to conduct an analysis and document activities necessary to ensure proposed management actions will not likely jeopardize the continued existence or cause adverse modification of habitat for Federally listed species, or for species listed as Sensitive by Region 5 of the USDA Forest Service.

This BE is prepared in accordance with the Endangered Species Act of 1973, as amended, and follows standards established in Forest Service Manual Direction (FSM 2671.2 and 2672.42) for Threatened, Endangered and Sensitive (TES) wildlife species. The purpose of this BE is to assess potential effects of the proposed activities of the above mentioned EA. Species to be considered in this document were determined based on review of the U.S. Fish and Wildlife Service website (http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=06035; accessed on 20 February, 2015), and on review of the USDA Forest Service Sensitive species list for Region 5. Tables 1a and 1b display whether the project is within the range of the species, whether suitable habitat is contained within or adjacent to the project, and whether the species has been previously detected within the area.

Table 1a. List of TES terrestrial wildlife species on the Lassen National Forest, and the status of each within the Eiler Project area.

Species name	TES status	Species detected w/in or adjacent to project area?	Suitable habitat within or adjacent to project area?	Species addressed in this document?
Gray wolf (Canus lupus)	FE	No	Not occupied	No
Northern spotted owl *(Strix occidentalis caurina)*	FT	N/A	N/A	No, project is outside range of species
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	FT	N/A	N/A	No, project is outside range of species
Northern bald eagle *(Haliaeetus leucocephalus)*	FSS	No	No	No, due to lack of suitable fish or waterfowl producing areas within area
Great gray owl *(Strix nebulosa)*	FSS	No	No	No, lack of suitable meadow foraging sites
Willow flycatcher *(Empidonax traillii)*	FSS	No	No	No, lack of suitable habitat

Table 1a, continued.

Species name	TES status	Species detected w/in or adjacent to project area?	Suitable habitat within or adjacent to project area?	Species addressed in this document?
California spotted owl *(Strix occidentalis occidentalis)*	FSS	Yes	Yes	Yes
Northern goshawk *(Accipiter gentilis)*	FSS	Yes	Yes	Yes
Greater sandhill crane *(Grus canadensis tabida)*	FSS	No	No	No, lack of suitable habitat
Yellow rail (*Coturnicops noveboracensis*)	FSS	No	No	No, due to lack of suitable large wet meadows or marshes
Sierra Nevada red fox *(Vulpes vulpes necator)*	FSS	No	No	No, lack of detections
Pacific fisher *(Pekania pennanti)*	FSS; P	No	No	No, lack of detections
American marten *(Martes americana)*	FSS	Yes	Yes	Yes
California wolverine *(Gulo gulo luteus)*	FSS	No	No	No, lack of remote, high elevation habitat
Pallid bat *(Antrozous pallidus)*	FSS	No	Yes	Yes
Townsend's big-eared bat *(Corynorhinus townsendii)*	FSS	No	No	No, due to lack of roost habitat in or near project area.
Fringed myotis *(Myotis thysanodes)*	FSS	Yes	Yes	Yes
Western bumble bee (*Bombus occidentalis*)	FSS	No	Yes	Yes
Shasta Hesperian snail (*Vespericola shasta*)	FSS	No	No	No, the project is outside the range of this species, endemic to the Shasta region.

Source: USFWS web site, accessed 20 February, 2015; Region 5's Sensitive species list
Symbols used: FT = Federally listed as Threatened; FE = Federally listed as Endangered
P = Proposed for Federal Listing
FSS = Forest Service Sensitive
N/A = Not applicable, outside range of species

One transient gray wolf, designated OR-7, traveled from Oregon to northern California in December, 2011. This individual wolf traveled extensively in northeastern California, including in and across the Lassen NF. OR-7 has since established a den site in southern Oregon. Due to the absence of the individual and the species, there would be no effects from the Eiler Project on gray wolves.

No bald eagle nests are located within the project area, and no water bodies of sufficient size or productivity exist that would support a bald eagle nest territory. Similarly, there are no meadows, marshes or riparian areas of sufficient size, productivity or vegetative condition that would provide suitable habitat for great gray owls, willow flycatchers, greater sandhill cranes or

yellow rails within the analysis area. Therefore, there would be no effects to these species or their habitat. No caves or cave analogs exist within or near the project boundaries, and Townsend's big-eared bats have not been detected near or within the project boundaries, therefore the Eiler Project would have no effect on Townsend's big-eared bats.

In 2010, 2011 and 2012, Pacific fisher (proposed for Federal listing as Threatened in October, 2014) were detected during camera surveys within the Green Mountain/Snow Mountain area of the Lassen NF. This is an isolated parcel of USFS lands, about 7,700 acres in size, located to the west of Burney Mountain. This parcel is about three miles west of the Lassen NF boundaries, separated from it by private timberlands, and is a little over six miles west of the nearest portion of the Eiler Fire. Another fisher was detected by a camera in 2009 about 12 miles north of the fire in Malinda Gulch, on the north side of the Pit River. However, no fisher have been detected during past camera surveys within or adjacent to the Eiler Fire area (K. Harville, personal communication, 2015). Fishers were also not detected during camera surveys conducted post-fire around the perimeter of the fire in the fall and early winter of 2014. Individuals of a population of introduced fisher, located on private timber lands near the west side of the Lassen NF far south of the project area, are not known to have entered the HCRD or the project area. Therefore, while fisher have been detected about six miles west of the fire, due to a continued lack of detections there is no evidence of the species occurring within or adjacent to the fire perimeter.

The Lassen NF's LRMP (USDA Forest Service 1993) established a network of fisher and marten habitat management areas (HMAs) and connecting corridors that stretch north to south across the Forest. The Thousand Lakes Wilderness area was identified as one of the fisher HMAs in this network. The Eiler Fire started within the Wilderness, and burned approximately 1,730 acres in the NE corner of the Wilderness. The fire did not affect the LRMP-designated HMA corridor leading out of the NW corner of the Wilderness. Within the burned area of the Wilderness, the proposed action of the Eiler Project would be limited to the potential felling, and leaving as logs, fire-killed hazard trees at specific sites such as along trails and adjacent to campsites. Due to the lack of detections of fisher from within or adjacent to the Eiler Fire area, and the very limited proposed action within the Wilderness area and the LRMP-designated fisher HMA, there should be no effects or jeopardy to Pacific fisher or their habitat as a result of this project.

No Sierra Nevada red foxes have been detected by past USFS survey efforts within or near the Eiler Fire perimeter. During the fall and early winter of 2014, 10 camera locations were operated for approximately one month at locations around the perimeter of the fire in unburned forests, and at the edge of the Thousand Lakes Wilderness. One marten was photographed at a Wilderness trailhead location, but no red foxes were photographed during this survey effort. Past survey efforts by the State Department of Fish and Wildlife also did not detect red foxes within the Thousand Lakes Wilderness or on Burney Mountain, although marten were detected at both

locations (Pete Figura, personal communication, 2014). Perrine (2005) considered marten to be more abundant than red foxes in the Lassen region, and concluded that red foxes had a more restricted distribution than marten within this area. A more restricted range than marten could explain the apparent absence of Sierra Nevada red fox from the Eiler Fire area. Modeled marten habitat on the Lassen NF (Rustigian-Romsos and Spencer 2010) indicates that the largest area of high probability marten habitat in the Eiler Fire area occurs more in the central and SW portions of the Thousand Lakes Wilderness in the area of the 8,000-plus foot peaks (Crater, Magee, and Fredonyer), with habitat quality decreasing with distance and elevation loss from these peaks. High probability marten habitat begins to subside at the edge of the Eiler Fire perimeter within the Wilderness, and ceases at the USFS-private boundary north of the wilderness. Another smaller, isolated area of high probability marten habitat was modeled on Burney Mountain. A more constricted range of red foxes may indicate that the patches of marten habitat identified within the Eiler Fire area are not sufficient in area or quality to provide suitable home ranges for Sierra Nevada red foxes. The most likely area of red fox presence, despite the lack of detections, would be within the Thousand Lakes Wilderness or in the adjacent Inventoried Roadless Area. Only a small percentage of the Eiler Fire burned within the Wilderness and Roadless Area, and the only potential management actions relative to this project would be the possible felling of hazard trees at specific sites (along trails or adjacent to established campsites); all treatments were deferred from the Roadless Area. Therefore, due to the apparent absence of Sierra Nevada red fox from the project area, the very limited potential for habitat modification within the Thousand Lakes Wilderness, and deferral of all treatments from the adjacent Roadless Area, Sierra Nevada red foxes will not be further discussed in this document.

The wolverine was proposed for Federal listing in February, 2013 (USFWS 2013); the USFWS withdrew this proposal in 2014 (USFWS 2014). The Eiler Fire analysis area landscape generally does not provide remote, high elevation, tree-line habitat preferred by wolverine (Grinnell 1933, Grinnell et al 1937, USDA 2001) or areas of deep snowpack (Brodie and Post 2010), and no wolverine have been detected during the years of camera survey efforts on the Lassen NF. Also, the proposed action within the Thousand Lakes Wilderness Area and adjacent Inventoried Roadless Area would be limited to removal of hazard trees along trails and near campsites within the Wilderness. Therefore, there would be no effect or jeopardy to wolverine or their habitat.

Table 1b, below, provides an assessment of Forest Service Sensitive and Federally listed aquatic species on the Lassen National Forest, their status within the Eiler Fire analysis area, and a determination of effects for the Eiler Project.

Table 1b: Aquatic TES species considered for the Eiler Project and species determinations.

Species (Listing Status)	Species or Potential Suitable Habitat Present and/or potentially affected (Yes/No)	Rationale (for addressing (or not) species further in this BE/BA and/or for species determination)	Species Determinations for the Eiler Fire Project
Central Valley steelhead DPS* (*Oncorhynchus mykiss*), FT	No	Project area is outside species' geographic range. (1, 2)	No effect
Central Valley spring-run Chinook salmon ESU** (*Oncorhynchus tshawytscha*), FT	No	Project area is outside species' geographic range. (1, 3)	No effect
Delta smelt (*Hypomesus transpacificus*), FT	No	Project area is outside species' geographic range. (4)	No effect
Winter-run chinook salmon ESU** (*Oncorhynchus tshawytscha*), FE	No	Project area is outside species' geographic range. (5, 6)	No effect
California red-legged frog (*Rana aurora draytonii*), FT	No	Project area is outside species' geographic range. (7, 8, 9, 10)	No effect
Shasta Crayfish (*Pacifastacus fortis*), FE	No	Project area is approximately 5 miles upstream of habitat on Hat Creek. There is a dam on Hat Creek between the project area and crayfish habitat. Project activities along Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit (103) that is separated from Hat Creek by Highway 89. No sedimentation from pile burning in this fuels treatment is expected to reach Hat Creek (Hydrology report, Project record).	No effect
Conservancy fairy shrimp (*Branchinecta conservatio*), FE	No	Project area is outside species' geographic range. (11, 12)	No effect
Vernal pool fairy shrimp (*Branchinecta lynchi*), FT	No	Project area is outside species' geographic range. (11, 12)	No effect
Vernal pool tadpole shrimp (*Lepidurus packardi*), FE	No	Project area is outside species' geographic range. (11, 12, 13)	No effect
Giant garter snake (*Thamnophis gigas*), FT	No	Project area is outside species' geographic range. (14)	No effect

Species (Listing Status)	Species or Potential Suitable Habitat Present and/or potentially affected (Yes/No)	Rationale (for addressing (or not) species further in this BE/BA and/or for species determination)	Species Determinations for the Eiler Fire Project
Sierra Nevada yellow-legged frog (*Rana sierrae*), FE	No	Project area is outside species' geographic range. (8, 9, 15, 16). General area has been surveyed for amphibians with no observations of this species reported. (17)	No effect
Foothill yellow-legged frog (*Rana boylii*), FSS	No	Project area is outside species' geographic range. (7, 8, 9).	No effect
Cascades frog (*Rana cascadae*), FSS	No	Project area is outside species' geographic range. (9, 16) General area has been surveyed for amphibians with no observations of this species reported. (17)	No effect
Northwestern pond turtle (*Clemmys marmorata marmorata*), FSS	No	Project area is outside species' geographic range. (9)	No effect
California floater (*Anodonta californiensis*), FSS	No	Project area lacks suitable habitat (slow, perennial rivers and large lakes with mud-sand substrate and stable shorelines at low elevation). (18, 19, 20, 21) General area has been surveyed for mollusks with no observations of this species reported. (20, 21)	No effect
Great Basin Rams-horn (*Helisoma newberryi newberryi*), FSS	No	Project area lacks suitable habitat (larger lakes, large, slower rivers, large spring sources and spring-fed creeks; with cold, highly oxygenated water, mud substrate, and slow water velocities). (18, 22) General area has been surveyed for mollusks with no observations of this species reported. (20, 21)	No effect
Scalloped Juga (*Juga occata*), FSS	No	Potential suitable habitat (large rivers with swift, unpolluted, cold, well-oxygenated waters with cobble/boulder substrates) exists within Hat and Honn creeks. Project activities along Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit (103) that is separated from Hat Creek by Highway 89. No sedimentation from pile burning in this fuels treatment is expected to reach Hat Creek (Hydrology report, Project record). General area has been surveyed for mollusks with no observations of this species reported (20, 21).	No effect

Species (Listing Status)	Species or Potential Suitable Habitat Present and/or potentially affected (Yes/No)	Rationale (for addressing (or not) species further in this BE/BA and/or for species determination)	Species Determinations for the Eiler Fire Project
Topaz Juga (*Juga acutifilosa*), FSS	No	Project area lacks suitable habitat (springs and their outflows with cold, well oxygenated waters) (20, 23). General area has been surveyed for mollusks with no observations of this species reported. (20, 21)	No effect
Montane Peaclam (*Pisidium ultramontanum*), FSS	No	Potential suitable habitat (large rivers with swift, unpolluted, cold, well-oxygenated waters with cobble/boulder substrates) exists within Hat and Honn creeks. Project activities along Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit (103) that is separated from Hat Creek by Highway 89. No sedimentation from pile burning in this fuels treatment is expected to reach Hat Creek (Hydrology report, Project record). General area has been surveyed for mollusks with no observations of this species reported (20, 21).	No effect
Nugget pebblesnail (*Fluminicola seminalis*), FSS	No	Potential suitable habitat (large rivers with swift, unpolluted, cold, well-oxygenated waters with cobble/boulder substrates) exists within Hat and Honn creeks. Project activities along Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit (103) that is separated from Hat Creek by Highway 89. No sedimentation from pile burning in this fuels treatment is expected to reach Hat Creek (Hydrology report, Project record). General area has been surveyed for mollusks with no observations of this species reported (20, 21).	No effect
Black Juga (*Juga nigrina)*, FSS	No	Hat Creek contains a possible new species of Juga previously lumped under the Black Juga. Project activities in Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit that is separated from Hat Creek by Highway 89. Project design would minimize risk of negative effects to water quality in Hat Creek (Hydrology report, Project record).	No effect
Kneecap lanx (*Lanx patelloides)*, FSS	No	Potential suitable habitat (large rivers with swift, unpolluted, cold, well-oxygenated waters with cobble/boulder substrates) exists within Hat and Honn creeks. Project activities along Hat Creek consist only of monitoring, possible hand planting of riparian vegetation, and hand-thinning of fuels in one unit (103) that is separated from Hat Creek by Highway 89. No sedimentation from pile burning in this	No effect

Species (Listing Status)	Species or Potential Suitable Habitat Present and/or potentially affected (Yes/No)	Rationale (for addressing (or not) species further in this BE/BA and/or for species determination)	Species Determinations for the Eiler Fire Project
		fuels treatment is expected to reach Hat Creek (Hydrology report, Project record). General area has been surveyed for mollusks with no observations of this species reported (20, 21).	
Eagle Lake rainbow trout (*Oncorhynchus mykiss aquilarum*), FSS	No	Project area is outside species' geographic range. (25)	No effect
Goose Lake redband trout (*Oncorhynchus mykiss ssp.*), FSS	No	Project area is outside species' geographic range. (25)	No effect
Hardhead *(Mylopharodon conocephalus)*, FSS	No	Project area is outside species' geographic range. (25)	No effect
Pacific lamprey (*Entosphenus tridentatus*), FSS	No	Project area is outside species' range; Shasta Dam prevents further upstream travel.	No effect

Source: U.S. Fish and Wildlife Service species list website (accessed on 30 October 2014), USDA Forest Service Sensitive species list for Region 5 (2013).
* Distinct Population Segment
** Evolutionarily Significant Unit
Symbols used: FT = Federally listed as Threatened
FE = Federally listed as Endangered
FSS = Forest Service Sensitive
Parenthesized references are listed in "References for Table 1b" at end of reference section

The only perennial streams within the project area are Hat Creek and Honn Creek, which is a bifurcation of Hat Creek. Flow from the ephemeral headwater channels within the project area lacks surface connectivity with any perennial streams. There are no proposed salvage activities or mechanical treatments within the riparian conservation areas (RCAs) of Hat and Honn Creeks. Riparian hand planting along Hat Creek may provide some future shade, but these effects are expected to be localized, as the scale of the planting is too small to have a measureable effect on stream temperature (Eiler Project Hydrology Report, project record). A small unit of 6.6 acres in size (unit 103) is located within a portion of the Hat Creek RCA and is proposed for hand fuels treatments, including hand piling and burning. No ash from pile burning in this unit is expected to reach Hat Creek or negatively affect water quality due to the following factors: treatments are at least 100 feet away from the stream and across California State Highway 89, flat topography, and lack of a surficial hydrologic connection between this unit and the perennial stream. The implementation of Integrated Design Features with regards to fuels activities within RCAs, such as no pile burning or ignition within meadow areas or wet sites, and no hand line construction within RCAs, further mitigate any risk of effects to water quality due to fuels treatments. Additionally, with the seasonal nature of streams within proposed mechanical salvage units and

lack of surficial connectivity to downstream perennial there is no risk of sedimentation to perennial waters.

Based on tables 1a and 1b, the USFS Sensitive species which will be addressed further in this document are: California spotted owl, northern goshawk, American marten, pallid bat, fringed myotis, and western bumble bee.

II. CURRENT MANAGEMENT DIRECTION

Management direction for USFS Sensitive species is provided by a variety of sources including the Forest Service Manual and Handbook (2670) and the 1993 Lassen NF Land and Resource Management Plan (LRMP), as amended. The LRMP provides standards and guidelines for Sensitive species which have been modified by several Forest Plan amendments, including the Sierra Nevada Forest Plan Amendment (SNFPA) FEIS and ROD (2001), and the SNFPA FSEIS and ROD (2004). Management direction specific to some Sensitive species, such as pallid bat, does not exist. However, direction exists to manage habitat for Sensitive species to ensure that these species do not become Federally listed as Threatened or Endangered due to Forest Service actions (FSM 2672.1). There is also direction for all native and desirable non-native vertebrate species to provide for diverse and viable populations (FSM 2670.22).

III. DESCRIPTION OF THE PROPOSED ACTIONS FOR EACH ALTERNATIVE

Below is a summary of the proposed actions within the Eiler Project. For a full description please see the Environmental Assessment for this project. The proposed action was developed to accomplish the purpose and need for the Eiler Project by evaluating existing vegetation conditions, burn patterns and intensities, and land allocations within the analysis area.

Table 1. Proposed treatment categories and estimated acres in the Eiler Project

Proposed Treatment	Treatment Acres	Reforestation Acres			
		Conventional	Cluster	Founder	Natural Regen
Roadside Hazard Trees	1,174	580	228	68	297
Area Salvage – Ground Based	2,567	1,357	1,119	27	65
Area Salvage – Helicopter Based	481	33	47	402	0
Area Fuels - Mechanical	517	250	39	7	221
Area Fuels - Hand	3,602	114	822	536	2,129
Baker Cypress Treatment	361	0	0	16	345
Reforestation Only		0	0	0	815
Total Acres	8,702	2,334	2,255	1,056	3,872
Deferred Treatment					
Natural Recovery	5,384				
Roadside Hazard Trees	34 miles				
Trailside Hazard Trees	2 miles				

Note: These acreages are subject to adjustment during analysis and implementation due to reductions for wildlife habitat, RCAs, archeological sites, stand deterioration, etc. Additional pockets of merchantable timber may be added in areas currently identified for area fuels treatment.

Hazard Tree Removal

The LNF proposes to fell and remove or fell and leave in place fire-affected hazard trees posing critical threats to safety along 34 miles of maintenance level 2 (ML2) and higher roads, and along two miles of trail within the Eiler Fire perimeter. Hazard tree marking guidelines would be based upon the fire-injured tree marking guidelines (Report #RO-11-01, Smith and Cluck, May 2011) at the 0.6 probability of mortality level (Pm=0.6) and hazard tree marking guidelines (Report #RO-12-01, Angwin et al., April 2012) developed by Region 5 Forest Health Protection. The guideline criteria for delayed, fire-related conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that are dead or have a high probability of mortality due to fire-injury or have structural defects that indicate high failure potential to abate potential hazards to visitors and improve safety and access within the Eiler Fire

area; and (2) retain those trees that would likely survive to maintain visual quality, wildlife habitat, and recreational values. This balance aims to retain healthy forested conditions while providing for safety and access to the area. Hazard trees are usually within one and a half tree lengths away from the road.

Merchantable trees would be removed using area salvage. Sub-merchantable trees and non-merchantable hazard trees would be felled and left in place, or piled and the piles burned, or broadcast burned depending upon the amount of surface fuel loading present.

Hazard trees would be felled and left in the Thousand Lakes Wilderness along trails and adjacent to campsites. Hazard trees would also be felled and left in place along the portion of the 33N06Y road that is in the IRA just north of the Thousand Lakes Wilderness. No other actions will take place in the wilderness and IRAs.

No snag retention is planned in these areas. Reforestation strategies in the Hazard Tree units would be the same as adjacent stands.

Area Salvage Harvesting

The Forest Service is proposing to salvage harvest fire-killed and fire-injured trees within the perimeter of the Eiler Fire. Merchantable trees would be removed as sawlogs if operations occur in a timely manner before the wood deteriorates. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, and/or broadcast burned to meet desired fuels conditions.

Fire salvage marking guidelines are based upon the fire-injured tree marking guidelines (Report #RO-011-01, Smith and Cluck, May 2011) developed by Region 5 Forest Health Protection at the 0.7 probability of mortality level (Pm = 0.7). The guideline criteria for delayed conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that are dead or have a high probability of mortality due to fire-injury; and (2) retain those trees that would likely survive to maintain wildlife habitat and desired forest cover.

The salvage harvest operations would utilize ground-based, mechanical harvesting to remove fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. On slopes greater than 35 percent, hand-felling and yarding by helicopter would be used to salvage harvest fire-killed and fire-injured trees from treatment areas. Area salvage harvesting would occur on approximately 3,289 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned. The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

With the proposed area salvage activities, approximately 125 acres would be treated within RCAs adjacent to stream channels and seasonal wetlands. Approximately 110 acres would be treated using ground-based mechanical equipment. In the remaining acres within RCAs proposed for area salvage, harvest activities would consist of hand-felling and helicopter yarding.

Within tractor units, snag retention leave islands would be generally two to five acres in size, and would comprise approximately 25 percent of the acres within each unit. Leave patches would be distributed across the unit to maintain diversity. While rocky areas may represent a small proportion of such patches, the majority would be in good growing sites so that the patches would contain an abundant understory in the future. Snag clump locations would not occur within 150 feet of aspen and cottonwood communties on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion.

Within the helicopter units, approximately 100 square feet of basal area per acre of snags would be left to maintain black-backed woodpecker habitat ranging from 10 inches diameter at breast height (DBH) to an upper diameter that will vary by unit. Snags less than 10 inches DBH would also be retained. Snags deemed as safety hazards during operations will be felled and left on site.

Snag retention would differ in the RCA land allocation to provide for future woody debris recruitment that would provide habitat structure and hydrologic function such as sediment trapping. The amount and distribution of standing trees retained would represent the range of natural variability of pre-fire suppression conditions. Within wet and dry meadows and intermittent stream RCAs, a minimum of one to two snags greater than 15 inches in diameter would be retained per 100 feet.

Area Fuel Treatments

In areas that were deforested but the size of the remaining timber is sub-merchantable, the Forest Service is proposing to treat fire-killed and fire-injured trees. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, or broadcast burned. Trees designated for removal and snag retention would use the same guidelines as discussed above under Area Salvage.

Snag retention leave islands would use guidelines as those discussed above for tractor area salvage units.

Mechanical

The fuels treatment operations could utilize ground-based, mechanical equipment to remove or arrange fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. Mechanical area fuels treatments would occur on approximately 517 acres. Activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

Hand

Hand felling would be used on slopes greater than 35 percent, in areas inaccessible to mechanical equipment, and in areas where the biomass is not removed. Hand fuels treatments would occur on approximately 3,361 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

Baker Cypress

Fuels treatments proposed in Baker cypress stands depend upon cypress density. On 200 acres where cypress occurs as isolated trees or small stands, standing fuels would be mechanically piled and burned. On 150 acres where pre-fire densities of cypress were high, and natural regeneration of cypress trees is expected to be high, hand-thinning treatments would occur only in areas where impacts to Baker cypress seedlings could be avoided. On 10 acres within the Eiler Gulch area where Baker cypress is scattered along the riparian corridor, hand thinning and pile burning activities are proposed. No additional site preparation would occur, although windrow spreading may occur within Baker cypress treatment units where windrows are not occupied by Baker cypress.

The remainder of the cypress occurs within hazard tree units or salvage units where impacts to the cypress would be minimized through project design features. Broadcast burning activities are not proposed within Baker cypress occurrences.

Reforestation

Reforestation is proposed on approximately 5,645 acres within the project area in sites prepared by salvage harvest and fuels treatment. In addition, sprouting shrubs and vegetation may need to be treated adjacent to planted trees to reduce competition for site resources in order to assure establishment. This may be done through manual or mechanical cutting methods such as grubbing, mastication, or the use of brush cutters. Soil windrows within burned areas would be spread out using heavy mechanical equipment. An effort will be made to spread the soil as evenly as practicable. All site preparation would occur prior to planting. Reforestation would typically need to occur within two years to increase the probability of survival of the planted trees with the competing brush.

Tree planting strategies would be implemented to comply with Region 5 Stocking Guidelines over time. These guidelines define future minimum and recommended stocking levels by forest type and site class, ranging from 75 to 300 trees per acre. Lower quality sites would have lower

stocking levels than higher quality sites, contributing to a heterogeneous forest structure across the landscape. Planted tree species would be appropriate for the site and would include a mixture of Jeffrey, ponderosa, western white, sugar pine, Douglas-fir, or incense-cedar. Red fir would be planted if a seed source is not present. Only native tree species grown from locally collected seed sources would be planted.

Four planting strategies are proposed for reforestation: conventional planting, cluster planting, founder stands, and natural regeneration (see Silviculture Report for description of strategies). Planting strategies would be utilized to assist in creating forest heterogeneity at different scales to produce a more disturbance-resilient landscape and enhance ecological function in the future. Topography, slope position, aspect, slope steepness, and soil productivity would be taken into account to create different forest structures on the landscape that mimic those created by an active fire regime. For example in steeper high elevation areas, density and canopy cover would be highest in valley bottoms, decreasing over the midslope and become lowest near and on ridgetops. In lower elevation broad valley bottoms, densities and canopy cover would be lowest near the bottoms and increase with elevation. Density and canopy cover along the hill slope would be higher on northeast aspects compared to southwest and vary with slope becoming more open as slopes steepen. This strategy would not only create heterogeneity to increase resiliency but would also create habitat for species that prefer denser canopy mature forest structures, such as northern goshawks. No reforestation would occur in snag retention leave islands.

Spacing for reforestation strategies were developed for these areas to encourage hardwoods and enhance meadow and riparian funtion. Hardwood trees would be encouraged and promoted where they exist in plantations. Planting densities would generally be lower and trees widely spaced around California black oak. Conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall.

Reforestation of conifers would not occur within 150 feet of aspen and cottonwood communties on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion. Where browsing inhibits recruitment of regenerating aspen and cottenwoods, fencing would be implemented to protect regeneration until suckers and sprouts exceed the browse line.

Reforestation planting strategies would differ as well with no reforestation occurring within 50 feet of the meadow edge. From 50 feet of the meadow edge and out, planting density would increase using the planting stategy and spacing based on the surrounding forest stand condition. Along stream channels and seasonal wetlands with existing riparian communities (e.g. willow, alder, aspen, sedges, rushes, etc.), reforestion of conifer species would not occur within 20 feet of the riparian plant community.

Where Baker cypress is widely scattered, reforestation with Baker cypress in founder stands would occur on up to 16 acres. Reforestation would not occur where pre-fire cypress distribution occurred at high densities and natural regeneration of cypress trees is expected to be high. No additional release activities would occur.

Forest Service personnel would visit riparian areas within the Eiler Fire perimeter during the growing season of 2015 to determine the amount and effectiveness of natural regeneration. If vegetation regrowth does not appear to be sufficient, then willow, aspen, sedges, and/or other appropriate riparian species would be hand planted as a follow-up treatment.

First- and third-year survival examinations on all planted units would occur. Planted units would be assessed for competing vegetation and the need for follow-up treatment to ensure survival and stocking are met. The proposed action includes at least one release treatment using manual or mechanical methods such as hand grubbing, mastication, or brush cutting to control competing vegetation within one to three years and a second treatment conducted within two to five years of planting. Animal control actions such as protective barriers or trapping may be used if warranted. Sites planted with trees should be certified of establishment five years after planting.

Transportation System

Where possible, the existing forest transportation system would be used to provide access to treatment units. Road maintenance, including surface protection and erosion control, would be performed on portions of the system as needed for project implementation. A dust abatement plan would be included to control wind-caused erosion from road use. National Forest System roads and non-paved County roads used for haul would receive pre-, during-, and post-haul maintenance.

Approximately 2.4 miles of existing non-system roads within the project area would be needed for project implementation, including salvage and fuels treatments, reforestation, and maintenance, due to the changed condition caused by the fire. These non-system roads would be added to the Forest transportation system as ML2 roads. Approximately one mile of new construction would occur to implement proposed actions. These roads would also be added to the Forest transportation system as maintenance level 1 (ML1) roads. Approximately one mile of temporary roads may be constructed to access proposed treatment areas. Following project implementation, these temporary roads would be decommissioned.

All water sources proposed for use in this project for dust abatement would be brought up to best management practice (BMP) standards, if they currently do not meet those standards. Water sources proposed for use in implementing this project include: Bidwell Pond (T34N R4E, S ½ Sec. 1) and Boundary Camp (T35N R4E SW¼ Sec. 33).

Alternative 2 - No Action

Under the No Action alternative, none of the activities proposed under Alternative 1 would be implemented. Hazard tree felling could occur along roads currently open to the public, trails, and developed recreation sites. These hazard trees could be felled and left in place as part of road maintenance as per LRMP direction. The No Action alternative would not preclude activities already approved in this area or activities planned as separate projects. No fuels treatments, site preparation, or reforestation would occur.

Alternative 3 - Road Hazard Only

To respond to concerns raised during public scoping, the Responsible Official has proposed limiting treatment to hazard tree removal along approximately 32 miles of roads. Commercial sized hazards would be felled and removed along ML2 and higher roads. Sub-merchantable hazards would be felled and left in place or piled and burned. No other site preparation or reforestation would occur along these roads. No other management activities (besides those previously authorized) would occur. The total footprint of treatments on National Forest lands under Alternative 3 would be approximately 1,095 acres. Existing roads used under this alternative would be repaired and maintained.

IV. EXISTING ENVIRONMENT

The Hat Creek Ranger District (HCRD) lies at the southern end of the Southern Cascades in northeast California. Prominent features within the Eiler Project area include the Thousand Lake Wilderness to the south, Hat Creek to the east and Burney Mountain to the west. Topography varies from broad and flat on lava flows to sloping terrain with elevations from approximately 3,200 feet to 7,863 feet. Soils vary widely from deep, productive soil to glacial sediment, to rocky lava flows. Most soils are stony. A few cinder cones occur in the area. In addition to two perennial streams (Hat and Honn Creek), riparian areas in the project area consist of seasonal drainages including Eiler Gulch, and seasonal wetlands such as Dutch Flat and Cornaz Lake.

Vegetative cover varies from eastside pine to mixed conifer and lodgepole pine at the higher elevations. Mixed conifer stands interspersed with brush fields occur throughout the area. Most of the brush fields have been cleared and planted to ponderosa pine and Jeffery pine (USDA Forest Service 1993).

Predominant conifer tree species within the project area include ponderosa pine (*Pinus ponderosa*), Jeffery pine (*Pinus jeffreyi*), incense cedar (*Calocedrus decurrens*), Douglas-fir (Pseudotsuga menziesii), white fir (*Abies concolor*), red fir (*Abies magnifica*), lodgepole pine (*Pinus contorta*), sugar pine (*Pinus lambertiana*), gray pine (*Pinus sabiniana*), western juniper

(*Juniperus occidentalis)* and baker cypress (*Hesperocyparis bakeri)*. Hardwoods found include aspen (*Populus tremuloides*), cottonwood (*Populus trichocarpa*), oak (*Quercus chrysolepis* and *Q. kelloggii*), big leaf maple (*Acer macrophyllum*), and white alder (*Alnus rhombifolia*). Common shrub species include sagebrush (*Artemesia tridentata*;), bitterbrush (*Purshia tridentata*), goldenbush (*Ericameria bloomeri*), tobaccobrush (*Ceanothus velutinus*), snowbrush (*Ceanothus velutinus*), manzanita (*Arctostaphylos patula* and *A. nevadensis*), and rabbitbrush (*Ericameria nauseosa*). There are 1,055 acres of plantations in the project area which burned at varying intensities. Approximately 401 acres of these plantations were younger; planted in 2012 after the Brown's Fire. The remaining plantations were planted prior to 1980.

Within the fire on USFS lands, there are approximately 4,575 acres of non-forested habitats. These areas included meadows, sagebrush and chaparral. Approximately 10,291 of coniferous and montane hardwood forested areas burned, primarily mixed conifer, with some lodgepole pine, ponderosa pine and conifer-black oak mix. These forested acres burned at various fire intensities. As measured by estimated basal area mortality, the acres and percent of forested acres burned in each severity category were:

- Low to moderate mortality (less than 50 percent mortality): 25 percent
- Moderately high mortality (50 to 75 percent mortality): 6 percent
- Very high (greater than 75 percent mortality): 69 percent

As indicated, on USFS lands the greatest proportion of burned forest burned at high severity. Generally, the lower to moderate burn severity effects are found on the outer edges of the fire with an average patch size of 35 acres and the high severity burn effects, which accounts for the majority of the burned area, are found in the center of the fire with one patch exceeding 17,700 acres, and an average patch size of 214 acres.

Most of the pre-existing forest habitat for species such as northern goshawks was burned at high intensities. A total of approximately 5,425 acres of CHWR strata 4M, 4D, 5M and 5D of coniferous forest types was estimated to existed within the burn perimeter prior to the fire. As measured by estimated basal area mortality, the acres and percent of forested acres burned in each severity category were:

- No mortality: 5 acres; 0.09 percent
- 0-25 percent mortality (Very Low): 336 acres; 6 percent
- 25-50 percent mortality (Low mortality): 471 acres; 9 percent
- 50-75 percent mortality (Moderate mortality): 504 acres; 9 percent
- 75-100 percent mortality (High): 4,109 acres; 76 percent

Much of the habitat that burned at low to moderate severity is located in the Thousand Lakes Wilderness and the adjacent Inventoried Roadless Area.

V. DIRECT, INDIRECT AND CUMULATIVE EFFECTS OF THE PROPOSED PROJECT AND ALTERNATIVES

Individual Species Accounts

The following species accounts for seven USFS Sensitive species provide a discussion of the existing condition relative to each species, including habitat status and known occurrences of the species and a discussion of the potential direct, indirect and cumulative effects of each action alternative and the no action alternative. A determination of effects is also provided for each species that is based upon the potential effects of the action alternatives.

In order to understand the contribution of past actions to the cumulative effects of the alternatives, this analysis assumes that current environmental conditions are a result of effects from past actions. As described in the document entitled "Past, Ongoing, and Reasonably Foreseeable Future Actions Report for the Eiler Project" (PORFFA, project record), this is because existing conditions reflect the aggregate effect of all previous human actions and natural events that have affected the environment and might contribute to cumulative effects. Cumulative effects discussions contained in the Eiler EA and specialists' reports do not try to quantify the effects of past actions by adding up all previous actions on an action-by-action basis.

Northern Goshawk

Existing condition: species and habitat account

Nest site habitat characteristics are the most studied aspect of goshawk habitat use patterns. Studies consistently indicate that goshawk nest in stands with greater canopy cover, greater basal area, and greater numbers of large diameter trees, less shrub/sapling/understory cover, and fewer numbers of small diameter trees relative to non-used, random sites (USDA 2001). Nest sites are generally on gentle to moderate slopes. High canopy cover was considered the most consistent structural feature across studies of goshawk nesting habitat (USDA 2001).

While dense canopy and mature forest is clearly important at landscape scales near nest sites, as distance from nest sites increase, the mixtures of other forest types and structures also increase so that nesting habitat becomes less distinguishable from the landscape with increasing area (DeStefano et al 2006).

Habitats used by foraging goshawks have been less studied than habitats used for nesting. Beir and Drennan (1997) found that foraging goshawks in Arizona utilized foraging sites that had higher canopy closure, greater tree density and greater density of trees >40.6 cm (about 16") DBH than on contrast plots. However, because goshawks forage primarily by making a series of

short flights that are punctuated by brief periods of prey searching from elevated perches (sit-and-wait predatory movements) (USDA 2001), it is unclear if they are foraging within these dense stands, or foraging from them, using dense trees as a form of ambush. For instance, Beir and Drennan (1997) suggested that in their study area, dense stands may have allowed goshawks to approach prey unseen.

Beir and Drennan (1997) suggested that foraging goshawks utilize all types of forested stands and exhibit flexible hunting strategies. Similarly, Reynolds et al (1992) suggested that goshawks may use habitat opportunistically for foraging because, 1) goshawks are often confronted by mosaics of forest types and conditions while foraging within large home ranges, 2) areas dominated by different but homogenous forest types or ages have supported nesting pairs, and, 3) direct observation of foraging goshawks show that they do hunt in many forest types and conditions. Goshawks may also take prey from within openings, usually hunting these areas using perches near the edge (Younk and Bechard 1994, cited in Graham et al 1999).

Habitat requirements of prey species include a variety of different habitat types and structures, such as early seral to mature forests and forest openings (Squires and Kennedy 2006). Several habitat characteristics appear to be important for a variety of prey species, including snags, downed logs, large trees, openings and associated herbaceous and shrubby vegetation, interspersion of habitats and forested canopy cover (Squires and Kennedy 2006). Reynolds (1992) recommended that foraging areas for goshawks include a variety of habitat types and structural classes.

Potential risk factors to goshawks include effects of vegetation management and wildfire on the amount, distribution, and quality of habitat (USDA Forest Service 2001). A recognized related benefit to achieving desired forest conditions in the recommendations for goshawks in the Southwest (Reynolds 1992) was a reduction in the hazard of catastrophic crown fires.

As per direction (USDA 2004), known goshawk nest sites on USFS lands are provided a 200 acre protected activity center (PAC). Goshawk PACs are delineated to: (1) include known and suspected nest stands and (2) encompass the best available 200 acres of forested habitat in the largest contiguous patches possible, based on aerial photography. Where suitable nesting habitat occurs in small patches, PACs are defined as multiple blocks in the largest best available patches within 0.5 miles of one another. Best available forested stands for PACs have the following characteristics: (1) trees in the dominant and co-dominant crown classes average 24 inches DBH or greater; (2) in westside conifer and eastside mixed-conifer forest types, stands have at least 70 percent tree canopy cover; and (3) in eastside pine forest types, stands have at least 60 percent tree canopy cover. Non-forest vegetation (such as brush and meadows) should not be counted as part of the 200 acres (USDA 2004, p. 38). Desired conditions for forested stands within goshawks PACs are, 1) at least two tree canopy layers, 2) dominant and co-dominant trees with average diameters of at least 24 inches DBH, 3) at least 60-70 percent canopy cover, 4) some

very large snags >45 inches DBH, and, 5) snag and down woody material levels that are higher than average (USDA 2004, p. 38).

PACs may be removed from the network after a stand-replacing event if the habitat has been rendered unsuitable as a northern goshawk PAC and there are no opportunities for re-mapping the PAC in proximity to the affected PAC (USDA 2004, p. 38).

Two goshawk nest sites, Burney Mountain and Cornaz Lake, were known from within the Eiler Fire perimeter. High fire severity within and around these two goshawk PACs rendered them unsuitable as goshawk nesting habitat. As a result they will be dropped from the network of goshawk PACs on the Lassen NF. A third goshawk PAC, Burney Springs, is located immediately to the west of the fire. Approximately 38 acres of the Burney Springs PAC was located within the fire perimeter and burned at high severity. These acres were also rendered unsuitable as nesting habitat; acres of suitable nesting habitat will need to be located outside the fire perimeter to make up for these burned acres. See Figure 1 in the Appendix for locations of the goshawk PACs in relation to the Eiler Fire.

Northern Goshawk

Environmental Effects: Alternative 1 – Proposed Action

Direct and Indirect Effects

As stated in the Existing Environment, the lower to moderate burn severity effects are generally found on the outer edges of the fire with an average patch size of 35 acres. High severity burn effects, which accounts for the majority of the burned area, are found more in the interior of the fire with one patch exceeding 17,700 acres, and an average patch size of 214 acres. As such, little green forest habitat survived the fire, and in the interior of the fire the patches that did are small and highly fragmented. Removal of dead and dying trees from within or from the edges of these patches would not be expected to change the CWHR classification of these areas, and thus salvage harvest would not be expected to reduce the acres of any remnant patches of green forest habitat. No surviving green forest goshawk habitat would be rendered unsuitable by the proposed action.

The Eiler Fire rendered a large area unsuitable as goshawk nesting habitat due to the high severity nature of the fire and the loss of dense canopied, mature forest. Included was the loss, due to large patches of high severity fire, of two known goshawk nest territories. Proposed treatments within the fire footprint will not further decrease this loss of reproductive habitat since the loss was already caused by the fire itself.

Foraging goshawks may take advantage of the short-term increase in prey availability resulting from the increase in snag and down wood component throughout the burn, especially on edges adjacent to low severity and unburned habitat. Under the proposed action, habitat elements such as snags and future downed woody debris would be reduced within salvage units, and may

reduce the quality of salvage units for northern goshawk foraging in the short-term. However, due to the nature of the fire, and the large patches of high severity fire within the interior of the burn, salvage units are generally not located adjacent to green forest habitat. Salvage units are focused predominantly in larger patches of forest which burned at high fire intensity. Juxtaposition of low and moderately burned forest with unburned forest generally occurs within the Thousand Lakes Wilderness and Roadless Area at the southern end of the fire. These areas would not be affected by proposed actions other than possible felling of hazard trees along trails and campsites within the Wilderness.

Inevitably, salvage harvest would reduce foraging habitat in the short term by removing snags more quickly than they otherwise would have remained standing within salvage units. However, project design standards would help mitigate this effect. Proposed in this alternative are 2,567 acres of ground-based salvage, 517 acres of mechanical fuels and 3,602 acres of hand fuels treatments. In all these treatments, totaling 6,686 acres, approximately 25 percent of each treatment type would be retained in un-harvested or untreated patches. This amounts to about 1,611 acres that would remain in its existing condition relative to snag densities, and which would provide some opportunities for foraging for this species.

In addition, the proposed snag retention within the 481 acres of helicopter harvest units would retain approximately 100 square feet of snags over 10" in diameter. During the design of this project, about 549 acres of proposed helicopter units were dropped from the proposed action in order to maintain burned forest habitat. While about 5-10 percent of the proposed helicopter units, as well as some of the dropped units, totaling over 1,000 acres, would be reforested to founder stands, the remaining 90-95 percent of these areas would still provide areas of burned forest habitat within treatment units.

Additionally, there would be no salvage harvest within the 2,226 acres of the inventoried Roadless Area on the north side of the Thousand Lakes Wilderness, and only site-specific hazard tree elimination within the 1,730 acres that burned within the Wilderness; these 3,956 acres would provide burned forest foraging habitat for goshawks.

Thus, about 6,400 acres of fire-killed snags would remain unharvested or lightly harvested in this alternative, representing about 43 percent of the 14,926 acres of USFS lands burned by the Eiler Fire. We recognize that actions proposed in the Eiler Fire (such as commercial salvage harvests and site preparation activities) would cause a reduction in burned forest habitat in order to meet desired conditions and objectives within these areas. However, design features built into the proposed actions will assure that a large amount of this habitat remains. .

Roadside hazard tree harvest would occur on approximately 1,174 acres. No designed snag retention was identified for these roadside areas due to potential hazards of snags to public safety on the adjacent roads. Because most of these roadside corridors have salvage units "behind"

them and these corridors would be harvested in conjunction with those adjacent units, effects of this treatment were merged into the discussion above.

Follow-up site preparation and tree planting within salvage units under the proposed action would accelerate the re-establishment of conifer seedlings within harvested areas, resulting in re-establishment of forested habitat sooner than under the no action alternative. This is especially the case given very large patches of high severity fire within the interior of the burn in which conifer seed sources would not be available to seed back in to initiate natural reforestation. Therefore, in the long-term there would be beneficial effects of this alternative in restoring forested habitats within the interior of the fire and hasten the return of forested habitat for this species relative to the no action. Project design would also maintain understory vegetation in the subsequent plantations, and would insure that other vegetative communities, such as aspen and oak, are considered in both site preparation and reforestation. These considerations would help insure habitat for small mammal and bird species within reforested areas, and should serve to enhance prey populations more so than if all plantations were planted and managed to conventional standards.

In summary, the salvage treatments under the proposed action may cause minor short-term reductions in foraging opportunities for northern goshawks, but in combination with tree planting would enhance the re-establishment of forest conditions in the long-term. The degree of the short-term effects would be minimized to some extent by the snag retention, large woody debris guidelines and consideration for the retention of understory vegetation and other vegetative communities within treatment areas.

Other potential effects include project-related activities such as human presence, mechanical activity, and noise created by project implementation. Prolonged disturbance from project activities could decrease goshawk foraging efficiency and disrupt typical behavior patterns. If present, individuals might alter their behavior by avoiding portions of the project area during project activities. The displacement would be short-term until project actions at a given location are completed. Due to the availability of suitable goshawk habitat outside the burned perimeter and within deferred areas within the fire perimeter, temporary displacement of foraging goshawks to adjacent suitable habitat should not be a considerable impact.

The 361 acres of Baker cypress treatments would occur within existing pine plantations. These pine plantations were old brushfield conversions that were initially developed in the 1930s. The presence of these brushfields was noted by General Land Office surveyors in 1881, and was recognized as reflecting a long history of past fires (Dunning and Kirk 1939). No mature forest occurs within these plantations, and due to the lack of density and forest structure these areas did not represent quality goshawk habitat prior to the fire. Therefore, the proposed Baker cypress treatments would not substantively affect goshawk habitat.

Northern Goshawk

Environmental Effects: Alternative 1 – Proposed Action

Cumulative Effects

The goshawk cumulative effects analysis area for this project was expanded from USFS lands to include all of the Eiler Fire perimeter, plus the portion of the Burney Springs goshawk PAC that extends outside of the burn perimeter. The cumulative effects analysis area was not extended beyond this due to lack of measurable direct and indirect effects at larger scales, and because goshawk foraging habitat includes an extremely wide range of forest structural types; the species is essentially a habitat generalist at larger, landscape scales.

Within the fire perimeter, the primary actions that could represent cumulative effects are fire salvage and reforestation actions on private lands that were burned, fuelwood harvest on USFS lands, and hazard tree removal along Highway 89, within a USFS campground and a USFS administrative site.

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most of the burned forest habitat on private lands. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, burned forest habitat will be removed. This would represent a short-term reduction in foraging habitat on these lands, since salvage would remove standing snags more quickly than they would otherwise topple, which would also serve to reduce future downed logs. However, due to snag habitat being considered during the planning and design of actions on USFS lands (see discussion above in Direct and Indirect Effects), this expected loss of burned forest habitat should not constitute a substantive cumulative effect on USFS lands.

Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are often with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would likely be much less understory vegetation within reforested areas on private lands than on USFS lands, and thus the assemblage of prey species that would occur on private lands, and their abundances, would differ from that on USFS lands. Species composition and density of the conifers within the planted areas would also likely differ. However, given the proposed action and its consideration of the value of understory vegetation in its design (see discussion in Direct and Indirect Effects, above) this should not represent a substantive cumulative effect for this species. Varying tree species composition and densities within the fire footprint across ownership boundaries would help foster future forest heterogeneity and avoid the homogeneity that would occur if all acres were planted to the same schemes and objectives.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags retained from salvage harvest would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads of both fires.

Fuelwood harvest would primarily be immediately along roads, as well as in relatively flat areas that allow off-road travel, such as along user-created roads, post-harvest skid trails, or along meadow edges. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. As part of the design of this project, snag retention clumps were not placed within approximately 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus retained snag patches would be distant from roadsides and less accessible than if they were located adjacent to roads. The presence of stumps along roadside corridors may also make off road travel difficult. Inevitably some retained snags will likely be removed by fuelwood harvesters. However, given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, most of the fuelwood harvest should be localized to areas that are accessible, as indicated by Siegel et al (2013). Also, because Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed as part of this alternative, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway. Thus this activity should not result in a substantial decrease in snags across all USFS lands involved in the fire.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of these sites are in developed locations along or within the Highway 89 corridor. Due to the developed, high-use nature of these sites, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

The Burney Spring goshawk PAC was slightly overlapped by the Eiler Fire, with the Fire burning about 38 acres of the PAC. These acres were rendered unsuitable as goshawk nesting habitat and will need to be replaced in order to bring the PAC up to the desired size of 200 acres; the currently delineated area for this PAC totals about 203 acres. This PAC was established

based on a 2004 reproductive event, with one goshawk fledgling confirmed. USFS lands near this PAC to the west of the Fire were included in the Whittington Forest Health Restoration Project (Whittington Project), an HFQLG project that authorized a range of fuels management projects with an objective to, "…restore habitats to a more ecological resilient condition while reducing the potential effects of severe wildfire…" (Harville 2012). The Whittington Project included treatments designed to create Defensible Fuel Profile Zones (DFPZs), reduce surface and ladder fuels, thin plantations and decadent brushfields, and accomplish hardwood, aspen, Baker cypress, and legacy tree release (Harville 2012). The Whittington Biological Evaluation (Harville 2012) analyzed the potential effects of that project on goshawks and their habitat, and included consideration of the Burney Springs goshawk PAC.

All Whittington Project actions were restricted from the Burney Springs goshawk PAC, thus there were no direct effects to this goshawk PAC. In addition, no actions were proposed north of FS Road 26 in the Burney Spring area, which is part of a California spotted owl PAC. Therefore there is suitable goshawk nesting habitat adjacent to the west boundary of the Burney Springs goshawk PAC in which to locate these 38 acres. None of these acres are encumbered by or immediately adjacent to management actions proposed by the Whittington Project. Therefore the Whittington Project would not represent a cumulative effect to the loss of goshawk PAC habitat caused by the Eiler Fire. The overall conclusion within the BE for the Whittington Project regarding goshawks was, "The major risk factors identified by the SNFPA (USDA 2001) for goshawks are the effects of vegetation management and wildfires on the amount and distribution of quality habitat. This slight decrease in habitat [as a result of the Whittington Project] is off-set by the fact that implementing this alternative would result in a long-term reduction in wildfire hazards, retain important habitat features for the goshawks, and create forest conditions that are overall more ecological resilient, which helps sustain goshawk habitat on the landscape. This management, along with the relatively stable geographic distribution and population levels of goshawks in the area and Lassen NF would not significantly reduce goshawk habitat or populations when also considering past, present, or foreseeable future events in the cumulative effects analysis area" (Harville 2012). The stated concerns regarding wildfire-induced loss of goshawk were proven accurate with the effects of the Eiler Fire.

Alternative 1: Summary of direct, indirect and cumulative effects, and viability determination – northern goshawk

The Eiler Fire rendered a large area unsuitable as goshawk nesting habitat due to the high severity nature of the fire and the loss of dense canopied, mature forest. Included was the loss, due to large patches of high severity fire, of two known goshawk nest territories. The salvage treatments under the proposed action may cause minor short-term reductions in foraging opportunities for northern goshawks, but in combination with tree planting would enhance the re-establishment of forest conditions in the long-term. The degree of the short-term effects would be

minimized to some extent by the snag retention, large woody debris guidelines and consideration for the retention of understory vegetation and other vegetative communities within treatment areas.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project may affect individuals of northern goshawks, but is not likely to result in a trend towards federal listing or loss of species viability.

Northern Goshawk

Environmental Effects: Alternative 2 – No Action

Direct, Indirect and Cumulative Effects

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of road corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with most of the fuelwood activity confined to roadsides or other accessible areas. Such activities would affect relatively few (7 percent) of the 14,926 burned acres on USFS lands, and over the majority of the burned acres snags would remain until they toppled due to decay. Burned vegetation would go through natural recovery and there would be little potential for disturbance to foraging goshawks.

Removal of hazard trees along Highway 89, and within the USFS Honn Campground and the USFS Hat Creek Work Center administrative site would occur. Due to the developed, high-use nature of these sites and the small acreage involved, this removal of hazard trees would not substantively affect goshawk habitat within the fire footprint.

Existing levels of large woody debris and snags would be maintained, and may provide short-term foraging opportunities to the northern goshawk, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation.

Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions and restoring goshawk habitat to the footprint of the fire.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting

potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint and potentially cause a loss of goshawk habitat on USFS lands outside of the Eiler Fire perimeter.

Cumulative effects of the adjacent Whittington Project would be as described for Alternative 1.

Northern Goshawk

Environmental Effects: Alternative 3

Direct and Indirect Effects

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Saw-timber sized hazard trees along 1,095 acres of roadside corridors would be commercially removed, while submerchantable trees along roads may be felled and left as logs or piled and burned. Hazard tree abatement would cause a minor reduction in the overall total of burned forest habitat on USFS lands within the Eiler Fire. Such activities would affect relatively few (7 %) of the 14,926 burned acres on USFS lands and over the majority of the burned acres snags would remain until they toppled due to decay. Vegetation would go through natural recovery and there would be little potential for disturbance to foraging goshawks.

Existing levels of large woody debris and snags would be maintained, and may provide short-term foraging opportunities to the northern goshawk, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation.

Due to the lack of reforestation on USFS lands, private land reforestation efforts within the Eiler Fire would gain importance as a means of hastening the restoration of forest cover and goshawk habitat within the footprint of the fire.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Northern Goshawk

Environmental Effects: Alternative 3

Cumulative Effects

The cumulative effects analysis area is as described under Alternative 1.

Due to the lack of salvage harvests other than roadside hazard tree removal in this alternative, potential for adverse cumulative effects of salvage harvest on private lands are further reduced as compared to Alternative 1. In contrast, given the lack of reforestation in this alternative, and as stated under Alternative 2, private land reforestation efforts within the Eiler Fire would gain importance as a means of hastening the restoration of forest cover and goshawk habitat within the footprint of the fire.

Accessible logs and snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. However, since the effects of woodcutting may be most pervasive along roads (Siegel et al 2013), and it would be in these areas that hazard trees would be removed commercially anyway as a result of this alternative, the potential effects of woodcutting would be diminished.

Cumulative effects of the adjacent Whittington Project would be as described for Alternative 1. Hazard tree removal in the Highway 89 corridor would be as described in Alternative 2.

Alternative 3: Summary of direct, indirect and cumulative effects, and viability determination – northern goshawk

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along 1,095 acres of roadside corridors would be removed or pile and burned. Vegetation would go through natural recovery and there would be little potential for disturbance to foraging goshawks. Existing levels of large woody debris and snags would be maintained, and may provide short-term foraging opportunities to the northern goshawk, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation. Due to the lack of reforestation on USFS lands, private land reforestation efforts within the Eiler Fire would gain importance as a means of hastening the restoration of forest cover and goshawk habitat within the footprint of the fire, and goshawk habitat in and around the Eiler Fire Salvage and Reforestation area would continue to be at risk from wildland fires. Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project may affect individuals of northern goshawks, but is not likely to result in a trend towards federal listing or loss of species viability.

California Spotted Owl

Existing condition: species and habitat account

Definitions of suitable California spotted owl habitat have been well described and reviewed in a number of recent sources, including the CASPO Technical Report (USDA 1993), the HFQLG FEIS (USDA 1999), the 2001 Sierra National Forest Plan Amendment (SNFPA) FEIS (USDA 2001), and the SNFPA FSEIS (USDA 2004). These reviews have consistently identified spotted owl habitat to be comprised of mature or late successional forest habitat that is relatively dense. Nesting and roosting habitat is generally characterized by canopy cover of ≥70 percent (USFWS 2006). California spotted owls are associated with mature forests characterized by dense canopies and large trees, snags and logs in the Sierra Nevada (Keane 2014).

Spotted owls nest in cavities, on top of broken trees, and on platforms located in older, larger diameter trees. Nests and roosts are typically located in stands that have >70 percent total canopy cover and contain one or several large trees and multiple canopy layers (Keane 2014). Blakesley et al. (2005) found the mean diameter of nest trees on the Lassen study area was 46" DBH, with over 90 percent of nests in >30" DBH trees. Testing against other habitat variables, Bond et al. (2004) found the greatest association with nesting to be number of large trees (>30") and canopy cover. In the Plumas-Lassen study from 2004-2006, approximately 53 percent of nest sites were in CWHR 5M, 5D, and 6 tree size/canopy cover classes, 37 percent were in CWHR 4M and 4D, and the remaining 10 percent were in more open, smaller-tree size CWHR classes with nests or roosts within remnant scattered large trees (USDA Forest Service 2009). Sixty-six percent of nest and roosts that were in the CWHR 4M and 4D classes were within stands with a large tree component (>24" DBH) (USDA Forest Service 2009).

Seamans (2005) studied California spotted owls on the Eldorado NF and found that the numbers of young fledged in a year, as well as much of the annual variability in population growth, was highly correlated with annual variations in weather. However, territory colonization and survival of spotted owls was highly correlated with the area of forest with high canopy cover (≥70 percent) dominated by medium (30.4-60.9 cm [12-24"] DBH, and large (>61 cm [>24"] DBH) trees at a 400 ha (about 1,000 acres) scale surrounding activity center locations. Seamans (2005) concluded that because population growth is most sensitive to survival, maintaining forests with high canopy cover dominated by medium and large trees was essential for sustaining his study population of spotted owls. Seamans (2005) found that the probability of territory extinction approached zero as the area of medium and large trees with high canopy approached 250 ha (617 acres).

Spotted owl foraging habitat includes stands with more open canopy than characteristic of nesting and roosting habitat. Quality of foraging habitat appears to decrease with decreasing canopy, with 40 percent canopy cover considered to be a lower threshold for suitable foraging habitat (USFWS 2003, USFWS 2006, USDA 2001, Verner et al 1992). Spotted owl literature

suggests that while higher canopy cover would provide better quality foraging habitat, 40 percent is considered a minimum threshold by the USFWS (USFWS 2006). For instance, on the Sierra NF, spotted owls tended to forage in sites with >50 percent canopy more than predicted based on the availability of that habitat, and foraged in stands with 40-50 percent canopy cover at a rate about equal to the availability of that habitat (USDA 2001). Forested stands with canopy cover of less than 40 percent are considered unsuitable for spotted owls. Irwin et al. (2007) found optimal foraging habitat was represented by moderately-dense forest with basal area from 152 to 240 ft^2/acre in Douglas-fir, white fir, and red fir, and greater basal area of large (>8" DBH) hardwoods. Daytime roosts are typically in denser forests with greater basal area and overstory canopy cover than for nocturnal roosts (Irwin et al. 2007).

California spotted owl home ranges have been found to be variable, with the smallest home ranges occurring in low-elevation, hardwood dominated sites, intermediate in mixed-conifer forests, and largest in true fir forests. Mean breeding season home ranges for pairs have been estimated at 2,500 acres in mixed-conifer forests on the Sierra NF, 4,700 acres in mixed-conifer on the Eldorado and Tahoe NFs, and 9,000 acres in red fir on the Lassen NF (USDA 2001, USFWS 2003). The proportion of older forests is a key predictor of home range size, with smaller home ranges having the higher proportions of older forests. As reviewed by Keane (2014), there is a strong association between spotted owls and the amount of mature forest habitat in core areas surrounding nest sites. Adult spotted owl survival is positively associated with the amount of mature forest at core and home range scales, and territory occupancy is also positively related to the amount of mature forest at core area scales.

The northern flying squirrel (*Glaucomys sabrinus*) and dusky-footed woodrat (*Neotoma fuscipes*) comprise the two primary prey species of the California spotted owl. Flying squirrels are the predominate prey in higher elevation conifer forests, and woodrats are the predominate prey in the lower elevation forests and woodlands (Munton et al. 2002, USDA Forest Service 2009). Pocket gophers (*Thomomys* spp.) were the second largest component (in biomass) of owl diets on Sierra National Forest in both the higher conifer-dominated elevations and the lower woodland elevations (Munton et al. 2002). Other prey items include other small mammals (especially *Peromyscus* spp.), birds, lizards, and insects (Munton et al. 2002, USDA Forest Service 2009).

Recent studies indicate that California spotted owls are able to persist in landscapes that experience low- to moderate-severity and mixed-severity wildfires. Bond et al. (2009) studied habitat use by seven California spotted owls that continued to occupy an area within the McNally Fire on Sequoia National Forest. The McNally Fire, which burned in 2002, resulted in a mosaic of burn severities: 31 percent remained unburned, 29 percent burned at low severity, 27 percent burned at moderate severity, and 13 percent burned at high severity (Bond et al. 2009). Within the fire, forest burned at low severity was selected for roosting, unburned forest was used for roosting in proportion to its availability, and forest burned at moderate severity was avoided for roosting;

only one roost was located in high-severity burn. Roost sites averaged tree-canopy cover of 63 percent. All burn severities were utilized by foraging spotted owls, and high severity burned areas were preferentially selected for foraging over unburned sites (Bond et al. 2009), although high severity burned forest represented on average only about 10 percent of the studied foraging ranges. Preferential use of the burned areas for foraging was considered to likely be due to an increased presence of prey promulgated by enhanced habitat conditions of increased shrub and herbaceous cover and number of snags (Bond et al. 2009). A negative effect of distance from the center of an owl's foraging range on utilization of burned habitat for foraging was found. The probability that any of the studied owls would use a site for foraging was greatest when the site was burned and located within approximately 1 km of a nest or roost center, and, for 5 of 7 owls, the strongest selection for foraging areas was in high severity burned forest within 1.5 km of the activity center (Bond et al 2009). Because burned forest may provide benefits to spotted owls, the authors recommended that burned forests within 1.5 km (about 1 mile) of nests or roosts of California spotted owls not be salvage harvested.

Bond et al (2013) investigated home range size and diet of spotted owls using the McNally Fire area. Within a 2 km radius surrounding 4 nest locations, an average of 23 percent of suitable habitat burned at moderate severities, and 9 percent burned at high severity. In a pooled sample of prey species from all four sites, 40 percent of prey biomass was represented by gophers, 26 percent by flying squirrels, and 11 percent by woodrats. The importance of gophers and woodrats in the diets of these owls may have been linked to the importance of shrubs and herbaceous vegetation for gophers and woodrats, and in turn to the abundance of these vegetation types within burned landscapes.

Lee et al (2012) studied 41 California spotted owl sites burned in six forest fires and found no significant effects of fire on the probabilities of local extinction and colonization at these sites. At the burned sites, using a 400 ha circle (about 988 acres) centered on an owl site, an average of 32 percent of suitable vegetation had burned at high severity, yet rates of colonization and of local extinction were not significantly different from those at unburned sites. Owls continued to occupy sites where nearly one third of suitable habitat burned at high severities.

More locally, spotted owls have been monitored within fires on the Plumas and Lassen NFs (USDA Forest Service 2012). The monitored fires have been the Moonlight-Antelope Complex fire area (MACFA) of 2007, and the Cub-Onion Complex fire area (CODFA) that burned in 2008. The MACFA fires burned primarily at high severity and totaled about 88,000 acres. The COCFA involved two fires that burned primarily at low- and moderate-severities, and totaled about 21,000 acres. About 52 percent of the MACFA burned at high severity, whereas only about 11 percent of the CODFA burned at high severity. The high-severity fires of the MACFA caused significant changes to the vegetation, reducing the amount of suitable spotted owl green forest habitat from 70.1 percent of the pre-fire landscape to just 5.8 percent. Prior to the 2007 fires, all or parts of 23 spotted owl PACs were located within the MACFA boundary; however,

given the lack of continuous surveys, it is uncertain how many of these PACs were occupied prior to the 2007 fires. Based on two years of surveys, researchers concluded that the primarily high-severity MACFA did not support California spotted owls other than a single pair that was using the landscape. However, territorial California spotted owl sites were well-distributed within a buffer area outside of the fire perimeter. Detections of individual spotted owls just within the perimeter of the burned areas suggested that some spotted owls are able to exploit the edge between the burned and unburned areas for foraging (USDA Forest Service 2012).

In contrast, monitoring of spotted owls within the COCFA indicated that spotted owls were able to persist in this post-fire landscape with similar abundance and spacing as has been observed in unburned forests outside the burned areas (USDA Forest Service 2012). The COCFA results suggest that spotted owls are able to persist within landscapes that experience predominantly low- to moderate-severity fires. Combined, the monitoring of the MACFA and the COCFA suggest that low- to moderate-severity fires may have positive or neutral effects on California spotted owls and their habitat, while high severity fires may result in greater negative effects (USDA Forest Service 2012).

The Eiler Fire, with over 70 percent of USFS lands burned at high severities, would be most similar to the MACFA in terms of fire-induced mortality. In contrast to the Eiler Fire, the McNally Fire, in which spotted owls were studied by Bond et al (2009), included just 13 percent high severity fire.

The barred owl poses a potential threat to the California spotted owl due to competition for food and nesting resources, possible displacement, hybridization with the spotted owl, and potentially increased spread of disease and blood parasites (USDA Forest Service 2009). Beginning around the late 1800s, the barred owl expanded its range from the forests east of the Great Plains to forests in the western United States, arriving in northern California around the late 1970s from Oregon, and in the Sierra Nevada in the 1980s where they have continued to increase in abundance though at a slower rate than their expansion in Washington and Oregon (Livezey 2009, USDA Forest Service 2009). The barred owl is more of a habitat generalist than the spotted owl, occupying a greater variety of habitats and having a wider range of prey than the spotted owl.

Long-term spotted owl demographic studies have been conducted on the Lassen NF, Sequoia-Kings Canyon National Park, and on the Eldorado and Sierra national forests. Population trends of California spotted owls and the demographic data was fully reviewed by the USFWS's 12-month finding for a petition to list the California spotted owl as threatened or endangered (USFWS 2006, p. 29892-29894). As per the USFWS review, the latest meta-analysis of demographic data from four Sierran study areas provided more positive, overall indications of population trends for spotted owls than did earlier analyses. The USFWS summarized the findings of the most recent meta-analysis by stating (p. 29894):

- adult spotted owl survival increased through time (an important finding due to spotted owl population growth being most sensitive to changes in adult survival [p. 29893]);
- most of the study populations demonstrated an increasing or stationary trend;
- there was no strong evidence for decreasing linear trends in lambda on any of the study areas;
- modeling of four study areas combined demonstrated that total hypothetical spotted owl numbers did not decrease over time.

However, the USFWS further stated that, "We find that with the exception of the LAS [Lassen NF] study area, California spotted owl populations in the Sierras show little evidence of a decline, and attempts to model future population trends are too imprecise to provide an accurate projection."

In a later meta-analysis of spotted owl population data (Blakesley et al 2010) the Lassen study area continued to show evidence for population declines relative to the stationary population estimates for the other three study areas analyzed. The authors suggested three possible explanations. The first was that the population decline in the Lassen study area may have occurred because it is located at the edge of the California spotted owl range with many territories in suboptimal, drier and higher elevation forest types. The second was that there may have been more timber harvest in the Lassen study area than in the other three areas. The third was that timber harvest had a greater negative effect on the Lassen relative to the other study areas because of the higher Lassen elevations where flying squirrels were the primary prey species. This study did find that after declines in the earlier years of the study, both recruitment and adult survival increased within the study areas.

Most recently, Connor et al (2013) also analyzed the demographic data and estimated a 93 percent probability of a decline within the Lassen NF study area. Overall, the California spotted owl demographic studies provide evidence for population declines on the three USFS study sites and a stable or increasing trend in the one study site on National Park Service lands; factors driving the population trends are not known (Keane 2014).

The Eiler Fire occurred largely within an Area of Concern (AOC; AOC number 1) identified within the California spotted owl technical report (Verner et al 1992, p. 45-48). These areas were identified as representing potential areas where future problems may be greatest if the owl's status in the Sierra Nevada were to deteriorate. The reason why this area was identified as an area of concern was, "Habitat in this area is discontinuous, naturally fragmented, and poor in quality due to drier conditions and lava-based soils" (Verner et al 1992, p. 48). Due to the xeric nature of the area, the large amount of eastside pine, and large, non-forested openings, this area was naturally and historically fragmented in terms of spotted owl habitat.

One known California spotted owl PAC exists within the fire perimeter. This PAC, Freaner Peak (state territory number SHA007), is located in the southern portion of the fire perimeter, north of the Thousand Lakes Wilderness on the north side of Freaner Peak. Another spotted owl

PAC (Burney Springs, SHA004) is located on the south side of Burney Mountain and to the west of the fire perimeter, and a third (Whittington Butte, SHA045) is also located to the west of the fire perimeter in the Horse Heaven Buttes area. The activity center locations of both the Burney Springs and Whittington Butte territories are greater than 1 mile from the fire perimeter. There was no overlap of the fire with either the PAC or HRCA associated with Whittington Butte, and only a very minor overlap of about 2 acres of the fire with the HRCA for Burney Springs. No salvage harvests would affect these two acres of the HRCA located within the fire perimeter. See Figure 2 in the Appendix for locations of spotted owl PACs and HRCAs in relation to the Eiler Fire.

California Spotted Owl

Environmental Effects: Alternative 1 – Proposed Action

Direct and Indirect Effects

Prior to the fire, approximately 3,359 acres of CWHR 4M, 4D, 5M and 5D existed within mixed-conifer, white fir and red fir forest types inside the fire perimeter. As a result of the Eiler Fire, this habitat was reduced to approximately 240 acres, a 93% reduction in these habitat types.

Most of this pre-fire habitat was in the southern portion of the fire within the Thousand Lakes Wilderness and Inventoried Roadless Area, and on the eastern slopes of Burney Mountain. There was a general lack of suitable habitat on the east side of the fire perimeter (lower elevation, drier sites with extensive brushfields) and within the isolated USFS lands within the interior of the fire that were also fragmented by brushfields and lava flow areas and surrounded by private timber lands. Even prior to the fire, these areas likely did not provide sufficient habitat to support reproductive pairs, and no owl sites were known from the interior portion of the fire.

The Freaner Peak owl PAC within the southern portion of the fire burned primarily at high severities. The nest location and surrounding stands also burned at high severity. Areas of low to moderate severity patches within the PAC were located near lava flows that helped break up the continuity of the fuels. The nest location was located immediately south of a property boundary between USFS and private lands, and most of the habitat existing prior to the fire was on the USFS side of the line. Given the high severity fire on USFS lands, and the general lack of habitat on private lands which also burned, it is unknown if spotted owls will continue to occupy this site.

However, the design of this project was in part based on the assumption that owls will continue to occupy the site, and salvage harvests and fuels reduction activities were minimized in proximity to the activity center location. Bond et al (2012) recommended that no salvage harvest occur within 1.5 km (about 1 mile) of a spotted owl activity center. Within a one mile radius of the Freaner Peak activity center the only proposed actions are roadside hazard tree removal along two road segments, totaling about 21 acres. The nearest salvage unit to the Freaner Peak activity center is about 1.2 miles distant. This unit is separated from suitable green forest habitat near the

activity center by about 0.4 miles. This intervening distance is comprised of high severity fire. Thus, the proposed action is consistent with the recommendations from Bond et al (2009), other than the approximate 21 acres of hazard tree removal.

Overall, within the HRCA for Freaner Peak owl, there would be about 72 acres of roadside hazard tree removal, plus 63 acres of ground-based salvage harvest. The only salvage operations proposed within lightly or moderately burned habitat within the HRCA for the Freaner Peak owl site is a minor amount of hazard tree removal along two roads, totaling about 0.25 miles in length of which about 5.6 acres is suitable habitat that burned at low to moderate intensities.

No fire salvage units or hazard tree units are located within a mile of the two spotted owl activity centers located to the west of the fire perimeter (Burney Springs and Whittington Butte). Nearest salvage or other actions to these activity centers is a helicopter unit, and Baker's cypress treatments in a pre-existing plantation, both located approximately 1.3 miles to the northeast and southeast, respectively, of the Burney Springs activity center. Within 1.5 miles of this activity center the only proposed treatments are about 26 acres of helicopter salvage and 6 acres of roadside salvage. The helicopter unit would retain approximately 100 square feet of basal area per acre of snags >10" DBH. As such, this area would maintain a high level of burned forest structure post-harvest, and while helicopter harvest would reduce the abundance of snags within the unit, this harvest should not prevent spotted owls from using this area post-harvest.

No treatments would take place within 1.5 miles of the Whittington Butte activity center. The nearest treatments, about 1.8 miles distant, are Baker's cypress treatments located in a pre-existing plantation that did not represent spotted owl habitat prior to the fire. The proposed action would not substantively affect owl habitat associated with these two activity centers.

Within and adjacent to the fire perimeter, these three spotted owl sites and the land allocations provided for them (PACs and HRCAs) are the most important areas of consideration for the management of this species relative to this project. Due to project design and the location of the fire relative to these activity centers and land allocations, the proposed action would have minimal effects to these areas. No other spotted owl activity centers were known to exist within or adjacent to the fire which likely reflects the lack of habitat on the east side of the fire perimeter (lower elevation, drier sites with extensive brushfields that did not provide dense-canopied mature forest) and the isolated nature of USFS lands within the interior of the fire that also were fragmented by brushfields and extensive lava flow areas. Even prior to the fire, these areas were likely of value to spotted owls more as dispersal habitat, not as reproductive habitat.

Hazard tree removal is proposed on about 1,174 acres of roadside corridors. On these acres most snags would be removed or felled, including the larger diameter snags that have potential of reaching the adjacent roadway. The reduction of fire-killed trees along roads has the potential to cause slight effects to prey populations in the short and long term, as well as the ability of owls to forage within these corridors. However, as discussed above, hazard tree removal is minimal near

known activity centers within and adjacent to the fire, and thus this relatively small amount of hazard tree removal relative to burned acreage throughout the rest of the fire (representing about 8% of burned USFS lands), would result in minor effects both in the short and long term.

As stated in the Existing Environment, the low to moderate burn severity effects are generally found on the outer edges of the fire with an average patch size of 35 acres. High severity burn effects, which accounts for the majority of the burned area, are found more in the interior of the fire with one patch exceeding 17,700 acres, and an average patch size of 214 acres. As such, only a small amount of green forest spotted owl habitat survived the fire, and in the interior of the fire the patches that did are small and highly fragmented. Removal of dead and dying trees from within or from the edges of these patches would not be expected to change the CWHR classification of these areas, and thus salvage harvest would not be expected to reduce the acres of any remnant patches of green forest habitat. Thus no surviving green forest spotted owl habitat would be rendered unsuitable by the proposed action.

Follow-up site preparation and tree planting within salvage units under the proposed action would accelerate the re-establishment of conifer seedlings within harvested areas, resulting in re-establishment of forested habitat sooner than under the no action alternative. This is especially the case given the very large patches of high severity fire within the interior of the burn within which there would be no or little conifer seed source for natural reforestation. Therefore, in the long term there would be beneficial effects of this alternative in restoring forested habitats within the interior of the fire that would in time enhance foraging habitat for this species relative to the no action.

The proposed action would retain, where available, a minimum of five logs per acre, representing a range of decomposition classes; this retention may include the three logs retained on the landscape for wildlife habitat. The proposed action also would provide for additional down woody material by leaving felled cull trees (dead trees with less than 25 percent sound wood) on site as needed to meet the three logs per acre requirement for down wood. Additional fire-damaged trees which die in the near-future would eventually topple within the treatment areas providing additional downed log recruitment. Providing for large woody debris retention within any areas treated would provide for prey habitat within areas proposed for treatment both in the short and long term.

Inevitably, salvage harvest within the fire perimeter would reduce foraging habitat in the short term by removing snags more quickly than they otherwise would have remained standing within salvage units. However, project design standards would help mitigate this affect. Proposed in this alternative are approximately 2,567 acres of ground-based salvage, 517 acres of mechanical fuels and 3,602 acres of hand fuels treatments. In all these treatments, totaling 6,686 acres, approximately 25 percent of each treatment type would be retained in un-harvested or untreated patches. This amounts to about 1,611 acres that would remain in its existing condition

relative to snag densities, and which would provide some opportunities for foraging for this species.

In addition, the proposed snag retention within the 481 acres of helicopter harvest units would retain approximately 100 square feet of snags over 10" in diameter. During the design of this project, about 549 acres of proposed helicopter units were dropped from the proposed action in order to maintain burned forest habitat. While about 5-10 percent of the proposed helicopter units, as well as some of the dropped units, totaling over 1,000 acres, would be reforested to founder stands, the remaining 90-95 percent of these areas would still provide areas of burned forest habitat within treatment units.

Additionally, there would be no salvage harvest within the 2,226 acres of the inventoried Roadless Area on the north side of the Thousand Lakes Wilderness, and only site-specific hazard tree elimination within the 1,730 acres that burned within the Wilderness; these 3,956 acres would provide burned forest foraging habitat for spotted owls.

Thus, about 6,400 acres of fire-killed snags would remain unharvested or lightly harvested in this alternative, representing about 43 percent of the USFS lands burned by the Eiler Fire. Given a very small amount of management actions proposed within or near known activity centers, and the general lack of habitat within the interior of the fire on USFS lands even prior to the fire, this alternative and its design features should not represent a substantive effect to spotted owl habitat within the fire area.

As stated earlier, the Eiler Fire occurred largely within an Area of Concern for California spotted owls identified by Verner et al (1992, p. 45-48). The reason why this area was identified as an area of concern was, "Habitat in this area is discontinuous, naturally fragmented, and poor in quality due to drier conditions and lava-based soils" (Verner et al 1992, p. 48). The Eiler Fire and its high proportion of high severity fire will exacerbate this naturally-occurring fragmentation. The fire caused a 93% reduction in 4M, 4D, 5M and 5D CWHRs in mixed-conifer, white fir and red fir forest types, reducing these habitat types from approximately 3,359 acres to 240 acres. The proposed action, by being largely consistent with recommendations by Bond et al (2009), likely won't further this fragmentation caused by the Eiler Fire itself.

The 361 acres of Baker cypress treatments would occur within existing pine plantations. These pine plantations were old brushfield conversions that were initially developed in the 1930s. The presence of these brushfields was noted by General Land Office surveyors in 1881, and was recognized as reflecting a long history of past fires (Dunning and Kirk 1939). No mature forest occurs within these plantations, and due to the lack of density and forest structure these areas did not represent spotted owl habitat prior to the fire. Therefore, the proposed Baker cypress treatments would not substantively affect spotted owl habitat.

California Spotted Owls

Alternative 1 – Proposed Action

Cumulative Effects

The cumulative effects analysis area for spotted owls for this and all alternatives was expanded from USFS lands to include the footprint of the Eiler Fire perimeter. Due to a slight overlap (2 acres) of the fire with land allocations associated with the Burney Springs owl territory, the cumulative effects analysis area was further expanded to include the remaining areas of these allocations to determine if any other management-induced effects existed to the spotted owl habitat contained within these land allocations. On-going projects within this cumulative effects analysis area include fire salvage on private lands, personal fuelwood harvest on USFS lands, and hazard tree removal along the Highway 89 corridor. Reasonably foreseeable future actions include treatments associated with the Whittington Project, a USFS project located immediately west of the Eiler Fire.

Within the fire perimeter, the primary actions that could represent cumulative effects are fire salvage and reforestation actions on private lands that were burned, and fuelwood harvest on USFS lands. Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most of the burned forest habitat on private lands. Similar to the effects on USFS lands, much of private timber lands burned at high severity. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, burned forest habitat will be removed. This would represent a removal of burned forest foraging habitat on these lands, especially near the activity center for the Freaner Peak owl site in the southern portion of the fire perimeter. However, due to past timber harvest, little green forest habitat existed prior to the fire in these areas of private timberland. Also, due to potential use of burned forest habitat by spotted owls being considered during the planning and design of actions on USFS lands (see discussion above in Direct and Indirect Effects) and the consideration of recommendations by Bond et al (2009), this expected loss of burned forest habitat should not constitute a substantive cumulative effect on USFS lands.

Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are often with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would likely be much less understory vegetation within reforested areas on private lands than on USFS lands, and thus the assemblage of prey species that would occur on private lands, and their abundances, would differ from that on USFS lands. Species composition and density of the conifers within the planted areas would also likely differ. However, given the proposed action and

its consideration of the value of understory vegetation in its design (see discussion in Direct and Indirect Effects, above) this should not represent a substantive cumulative effect for this species. Varying tree species composition and densities within reforested areas across ownership boundaries would help foster future forest heterogeneity and avoid the homogeneity hat would occur if all acres were planted to the same schemes and objectives.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20" DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014 after the fire, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags retained from salvage harvest would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be "pervasive" along roads of both fires.

As observed by Siegel et al (2013), fuelwood harvest would primarily be along roads, as well as in relatively flat areas that allow off-road travel, such as along user-created roads, post-harvest skid trails, or along meadow edges. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. As part of the design of this project, snag retention clumps were not placed within about 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus retained snag patches will be removed from roadsides and less accessible than if they were located adjacent to roads. The presence of stumps along roadside corridors may also make off road travel difficult. Inevitably some retained snags will likely be removed by fuelwood harvesters. However, given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, many areas would be inaccessible to woodcutters. Also, because Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway as part of this proposed action. Due to inaccessibility by road, the PAC and most of the HRCA associated with the Freaner Peak activity center would not be affected by fuelwood harvest. Thus this activity should not result in a substantial decrease in snags across all USFS lands involved in the fire.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of

these sites are in developed locations along or within the Highway 89 corridor. Due to the developed, high-use nature of these sites, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Potential future projects within the analysis area include the Whittington Project, an HFQLG project that authorized a range of fuels management projects with an objective to, "…restore habitats to a more ecological resilient condition while reducing the potential effects of severe wildfire…" (Harville 2012). Included in the project were treatments designed to create Defensible Fuel Profile Zones (DFPZs), reduce surface and ladder fuels, thin plantations and decadent brushfields, and thin and accomplish hardwood, aspen, Baker cypress and legacy tree release (Harville 2012). The Biological Evaluation for this project (Harville 2012) analyzed the potential effects of this project on California spotted owls and their habitat. HRCAs and the standards and guidelines associated with HRCAs did not apply to projects during the HFQLG planning period (USDA 2004, pp. 66-69). Instead, during the HFQLG planning period land allocations associated with spotted owl activity centers were 300 acre PACs and 1,000 acre spotted owl habitat areas (SOHAs). HFQLG timber harvest activities such as DFPZs, group selections and individual tree selection timber harvest were restricted from both PACs and SOHAs. The SOHA delineated for the Burney Springs owl site was incorporated within the HRCA as currently delineated for this site. The Burney Springs SOHA and HRCA were slightly overlapped by the Eiler Fire, with the Fire burning about 2 acres of these allocations. The 2-acre overlap of the Eiler Fire was on the combined SOHA/HRCA delineation; the fire did not affect the Burney Springs owl PAC. These burned acres were rendered unsuitable as green forest habitat due to the severity of the fire. See Figure 3 in the Appendix for the locations of the spotted owl PACs and HRCA in relation to the Whittington Project.

All Whittington Project actions were restricted from the 314 acre Burney Springs owl PAC, thus there were no direct effects of this project to the PAC. In addition, as per HFQLG standards and guidelines, there were no project actions proposed within the 1,132 acre Burney Springs SOHA. Therefore, the 2-acre overlap of the Eiler Fire with the SOHA would not result in a substantive reduction in habitat of this land allocation, and sufficient acreage would still be available to meet the direction for this allocation. As mentioned earlier, the SOHA was part of a previous planning period, and is no longer recognized as a land allocation for California spotted owls. The thousand-acre SOHAs were replaced by HRCAs in the 2004 ROD (USDA 2004). The size of HRCAs on the Hat Creek and Eagle Lake RDs are desired to be 2,400 acres (USDA 2004, p. 39), with these acres being inclusive of the 300 acre PAC.

The HRCA mapped for the Burney Springs owl site is in three polygons, necessitated by the presence of two large brushfields/plantations on either side of the PAC, and extensive talus slopes to the north of the PAC on the southern slopes of Burney Mountain. Two of the HRCA polygons, of 382 and 213 acres, were avoided by the Whittington Project, as these were part of the previously delineated SOHA. The third HRCA polygon, of 723 acres, is affected by

Whittington Project actions. Treatments proposed within the Whittington Project include about 389 acres that are within this HRCA polygon.

Within these acres, the Whittington Project would implement thinning (Treatment A) and group selections. Treatment A was described as thinning to, "…improve fire resistance, increase lateral and vertical structural diversity, and move forested areas towards a more historical species composition by releasing healthy desirable trees (ponderosa/Jeffrey pine, sugar pine, Douglas fir, hardwoods) and reducing inter-tree competition for site resources. The average desired stocking level (basal area) would range from 120 square feet to 180 square feet per acre, based on species composition and location. Tree spacing would be variable and would include small openings and clumps of denser trees throughout the stands. Only trees less than 30.0 inches DBH would be removed."

Treatment A was more fully described as: Within areas classified as CWHR 4D, 4M, 5D, 5M, and 6, canopy cover would be retained at a minimum of 50 percent. However, where it is necessary to meet the desired conditions listed above, it may be necessary to retain less than 50 percent canopy cover in site specific areas. In such site specific areas, treatments would retain the highest percentage canopy cover practicable, but would not result in less than 45 percent canopy cover. Post-treatment canopy cover would be calculated on a stand basis and would include all treatments, such as radial release.

Within group selections, most or all of the conifers less than 30.0 inches DBH would be removed to create space for a new cohort or age class of conifer trees. All trees greater than or equal to 30.0 inches DBH would be retained regardless of species and condition.

The effects of these treatments were analyzed in the Whittington Project BE (Harville, 2012). Due to project design features outlined above, no habitat would be 'lost' because of the thinning prescription due to the residual canopy cover being kept at above 45 percent and the retention of unthinned patches within the unit. The basic effect would be to reduce the quality of the habitat, since some acres of dense canopy (4D and 5D) would be altered to moderate canopy (4M, 5M). For instance, about 58 acres of 5D would be reduced to 5M. An unknown amount of habitat would be removed due to any group selection harvest, however the number of group selection harvests that may be proposed for the area of overlap was not established.

Based on the overall analysis of effects of short-term habitat effects as well as long-term benefits of fuels reduction and overall more resilient forests, the summary determination of effects to California spotted owls and their habitat was that the Whittington project may affect individuals, but was not likely to result in a trend toward Federal listing or loss of viability for the California spotted owl. This determination was based on (Harville 2012):

- Although operations may affect individual owls or an owl pair through changes in forest structure and disturbance, the overall reduction in fire risk, and an emphasis on restoring

forest structure and ecological functions, would help maintain and increase California spotted owl habitat.

- Almost all of the suitable spotted owl habitat (with more than 40 percent canopy closure) was within spotted owl PACs, HRCAs and SOHAs within the analysis area, outside of actual project treatment units. These areas would remain protected and project implementation would help to protect them from catastrophic fire
- Some amount of high quality (5D, 6D habitat) would be lost initially. The amount of high quality forest habitat (classes 5M and 5D) would increase over time, after treatment has been completed, due to forest growth from lower quality habitats (classes 4M and 4D, 5M, 6M).
- There would be a small amount of reduction in nesting habitat, short-term. This was a result of the of proposed project thinning activities in suitable habitat in the project area.

Seamans (2005) concluded that forests dominated by medium and large trees and canopy closures of 70 percent or greater (roughly equivalent to 4D and 5D CWHR strata) within a 1,000 acre circle around activity centers was essential to sustaining spotted owls on the Eldorado NF. It is unclear how the projected habitat changes due to the Whittington Project would compare to his findings since the habitat changes were not analyzed relative to Seaman's study results. Also, one study Seamans and Gutierrez (2007) reported that alteration of as little as 50 acres of high-canopied forest habitat within 400 ha (about 1,000 acre) circles surrounding activity centers increased the likelihood of territory extinction, and that the likelihood of territory abandonment following habitat alteration increased sharply when there was <150 ha (<370 acres) of this habitat available within the 400 ha (about 1,000 acres) circle surrounding the activity center.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and, as a result, the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project will not substantively add to these effects to spotted owls and their habitat within the fire footprint due to project design features that restricted almost all actions within one mile of known activity centers, and due to the lack of spotted owl activity centers within the interior of the fire footprint. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive. Outside the fire footprint, within the larger cumulative effects analysis area, reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to owl habitat within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire itself.

Alternative 1. Summary of direct, indirect and cumulative effects, and viability determination – California spotted owl

The Freaner Peak owl PAC within the southern portion of the fire burned primarily at high severities. The nest location and surrounding stands also burned at high severity. However, the design of this project was in part based on the assumption that owls will continue to occupy the site, and salvage harvests and fuels reduction activities were minimized in proximity to the activity center location. The proposed action is consistent with the recommendations from Bond et al (2009), other than the approximate 21 acres of hazard tree removal. In addition, the proposed action would not substantively affect owl habitat associated with two activity centers located to the west of the fire perimeter. Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and, as a result, the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to spotted owls and their habitat within the fire footprint due to project design features that restricted almost all actions within one mile of known activity centers, and due to the lack of spotted owl activity centers within the interior of the fire footprint. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive. Outside the fire footprint, within the larger cumulative effects analysis area, reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to owl habitat within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire itself.

Based on the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project may affect individuals of California spotted owls, but is not likely to result in a trend towards federal listing or loss of species viability.

California Spotted Owl

Environmental Effects: Alternative 2 – No Action

Direct, Indirect and Cumulative Effects

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with fuelwood activity largely confined to roadsides or other accessible areas. Such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and burned-area vegetation would go through natural recovery. As such, there would be little potential for

disturbance to foraging spotted owls. Also, because no roads enter the PAC associated with the Freaner Peak PAC, no hazard tree removal or fuelwood harvest would affect this area.

Existing levels of large woody debris and snags would be maintained, and may provide enhanced short-term foraging opportunities to California spotted owls, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation. Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire.

Removal of hazard trees along Highway 89, within the USFS Honn Campground and the USFS administrative site at the Hat Creek Work Center would take place outside of this document. All these sites are in developed locations along or within the Highway 89 corridor. Due to the developed, high-use nature of these sites, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint and cause a loss of green forest spotted owl habitat on USFS lands outside of the Eiler Fire perimeter.

Cumulative effects to California spotted owls from the Whittington Project would be the same as described for Alternative 1.

California Spotted Owls

Environmental Effects: Alternative 3

Direct and Indirect Effects

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Saw-timber sized hazard trees along roads would be felled and commercially removed, while submerchantable trees along roads may be felled and left as logs or piled and burned. A total of about 1,095 acres of

hazard tree removal would be implemented by this alternative. Hazard tree abatement would cause a minor reduction in the overall total of burned forest habitat on USFS lands within the Eiler Fire. Relatively few of the 14,926 burned acres on USFS lands would be affected, and over the majority of the burned acreage snags would remain until they toppled due to decay. Due to the lack of reforestation activities, burned-area vegetation would go through natural recovery. Given the restriction of timber harvest to road corridors, there would be little potential of disturbance to foraging or nesting spotted owls. No roads enter the PAC for the Freaner Peak spotted owl site, thus there would be no activity-related disturbance to this site.

Existing levels of large woody debris and snags would be maintained outside of road corridors, and may provide enhanced short-term foraging opportunities to California spotted owls, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

California spotted owls

Environmental Effects: Alternative 3

Cumulative Effects

Due to the lack of salvage harvests other than roadside hazard tree removal in this alternative, potential for adverse cumulative effects of salvage harvest on private lands are further reduced compared to Alternative 1. In contrast, given the lack of reforestation in this alternative, and as stated under Alternative 2, private land reforestation efforts within the Eiler Fire would gain importance as a means of hastening the restoration of forest cover and potential spotted owl habitat within the footprint of the fire. Accessible logs and snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. However, since the effects of woodcutting may be most pervasive along roads (Siegel et al 2013), and it would be in these areas that hazard trees would be removed commercially anyway as a result of this alternative, the effects of woodcutting would be much diminished.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. The limited treatments proposed within this alternative of the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to California spotted owls and their habitat. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive.

Reasonably foreseeable future treatments associated with the Whittington Project would be as described in Alternative 1. Potential cumulative effects of hazard tree removal in the Highway 89 corridor would be as described under Alternative 2.

Alternative 3: Summary of direct, indirect and cumulative effects, and viability determination – California spotted owl

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being commercially removed, and smaller diameter trees within these corridors may be piled and burned. Logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with fuelwood activity largely confined to roadsides or other accessible areas. Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire. Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of California spotted owls, but was not likely to result in a trend towards federal listing or loss of species viability.

Based on the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project may affect individuals of California spotted owls, but is not likely to result in a trend towards federal listing or loss of species viability.

American Marten

Existing condition: species and habitat account

Marten prefer high elevation coniferous forests with close-canopied, late-seral attributes such as large diameter trees, large downed logs, and moderate to high canopy closure. High elevation, late seral forests were important for marten in the Lassen area (Kirk and Zielinski 2009). In the southern Cascades and northern Sierra Nevada, Kirk (2007) noted that 85 percent of contemporary marten detections in his analysis occurred above 6,000 feet elevation (despite a reduced survey effort at these higher elevations), 15 percent of detections were between 3,000 and 6,000 feet, and no detections of marten occurred below 3,000 feet elevation. Marten distribution in California corresponds closely to the regions of the heaviest snowfall in the southern Cascades and the Sierra Nevada (Krohn et al. 1997).

In the Sierra Nevada and Cascade Range of California, martens are associated with late-successional forests dominated by true fir and lodgepole pine forests and are most abundant where old-growth forest characteristics are abundant (Zielinski 2012). Marten generally avoid

young forest and habitats without sufficient overhead cover. However, overhead cover can be in the form of shrubs, at least seasonally. Ellis (1998) found that in summer, male marten in the Swain Mountain area used shelterwood stands with less than 20 percent cover more than expected based on availability. However these shelterwood stands were characterized by dense shrub cover that provided dense overhead cover during the summer season, and in summer chipmunks and ground squirrels were available in these relatively open areas. Female marten, however, showed strong year-round selection of old-growth stands (uncut, large-tree stands with tree cover >69 percent) (Ellis 1998). Koehler and Hornocker (1977) suggested that while open meadows and burns may be avoided by marten in winter when they are under a heavy snowpack, these areas may be used in the summer, or in low snow years, if they provide adequate cover and food. In Colorado, Baldwin and Bender (2008) found that while martens routinely avoided open herbaceous wetlands and herbaceous uplands, one of their models indicated marten appeared to use talus and rock fields, possibly because these areas provided cover and foraging opportunities.

Marten are sensitive to the loss and fragmentation of mature forest habitat and rarely occupy areas after >30 percent of the mature forest has been harvested. Marten in Utah were absent in landscapes in which the proportion of natural openings and clearcuts exceeded 25 percent (Hargis and Bissonette 1997, cited in Potvin et al 2000); Potvin et al (2000) recommended that less than 30 percent of a landscape be in clearcuts. In Utah, Hargis et al. (1999) found that marten captures declined as openings in the landscape increased. They also noted declines in marten captures as edge increased and where open areas were more closely spaced. No captures occurred where openings occupied greater than 35 percent of the landscape or where the average distance between openings was less than 100 meters.

CWHR strata considered to provide high quality marten reproductive habitat were modified by Kirk (2007) and Moriarty (2009). Based on these modifications, CWHR vegetation types and structure considered to provide high quality reproductive habitat were:

- lodgepole pine (4M, 4D, 5M, 5D)
- montane riparian (5M, 5D, 6)
- white fir (4M, 4D, 5M, 5D, and 6)
- red fir (4M, 4D, 5M, 5D)
- subalpine fir (4M, 4D, 5M, 5D)
- mixed-conifer fir (5M, 5D, 6)
- white fir (4M, 4D, 5M, 5D, 6)

Marten home ranges in the central and northern Sierra averaged 960 acres for males and 801 acres for females (Simon 1980, Spencer 1981, cited in USDA 2001). Locally a study conducted in the Swain Mountain area (Ellis 1998) calculated annual home ranges at approximately 5.5 square miles for males (3584 acres) and 2.5 square miles (1,536 acres) for females. In northeastern Oregon, Bull and Heater (2000) found that marten resting sites included natural platforms in trees, tree cavities, subnivean spaces, hollow logs and slash piles, and underground,

while den locations included tree cavities, hollow logs, underground locations, and in slash piles. As a result, the authors recommended that in order to provide martens with den and resting locations, land managers should retain large diameter hollow logs and trees, accumulations of coarse woody debris, and trees with mistletoe brooms that provide platforms. Marten resting and den sites are associated with closed canopied forests. Spencer et al (1983) found that marten in the Sierra Nevada selected stands with 40 to 60 percent canopy closure for resting and foraging and avoided stands with less than 30 percent canopy closure. Marten rest sites in winter are most often in subnivean sites most often associated with course woody debris especially during periods of colder temperatures and recent precipitation but can also be found in association with rocks (Bull and Heater 2000, Wilbert et al. 2000).

Coarse woody debris is an important component of marten habitat, especially in winter, by providing structure that intercepts snowfall and creates subnivean tunnels, interstitial spaces, and access holes. Sherburne and Bissonette (1993) found marten more likely to utilize subnivean access points in areas that contained more abundant prey. They also found that when coarse woody debris covered a greater percent of the ground, marten use also increased (Sherburne and Bissonette 1993). Older growth forests with accumulated coarse woody debris provide the forest floor structure necessary to enable marten to forage effectively during the winter (Sherburne and Bissonette 1993).

Marten are dietary generalists, and diet may change with seasonal prey availability. In the Sierra Nevada, marten diets consist primarily of voles, Douglas' squirrels, northern flying squirrels, snowshoe hares, chipmunks and golden-mantled ground squirrels, with voles being important year-round, and Douglas' squirrels becoming more important in the winter months (USDA 2001). Bull (2000) considered marten to be a generalist predator due to a wide diversity of prey. Of particular importance were vole-sized and squirrel-sized mammalian prey, insects, plants and birds, with larger prey (squirrels, woodrats and snowshoe hares) being more common in the winter.

In northeastern California marten are thought to have experienced a loss of once-occupied range (Zielinski et al 2005). Kirk and Zielinksi (2009) used landscape-scale habitat associations to develop a model to predict marten occurrence in northeastern California, including the Lassen NF. The model that best fit the data suggested that remaining marten populations were associated with sites with the largest amount of reproductive habitat (dense, old forest) the greatest number of nearby habitat patches, and nearby reserved land, such as Wilderness areas. Sites with marten had more reproductive habitat and interior forest, more patches of reproductive habitat, and larger mean reproductive habitat patches. Overall, the study found that the available habitat for marten had been reduced in area since the early 1900s.

In the Sagehen Creek basin in the Tahoe National Forest, Moriarty (2009) found that marten detections decreased from an average detection rate of 65 percent in the early 1980s

to 4 percent in her study conducted from 2007-2008, based on similar but not identical methodology. The reasons for the apparent decrease in marten abundance were not clear, but may have included reduction of habitat quality, increase in habitat fragmentation, loss of important microhabitat features such as snags and down woody material, or other factors (Moriarty 2009). Moriarty (2009) suggested that rather than amount of habitat, it was likely that the size of patch core areas, distance between patches, spatial configuration of patches, and microhabitat features within patches may be more important for marten persistence.

In 2010, the Lassen NF contracted with Conservation Biology Institute to develop a habitat suitability model for marten on the Lassen to assist with project planning. Three models of habitat suitability were developed that were based on season-specific marten survey data for summer, winter and year-round (Rustigian-Romsos and Spencer 2010). The summer model predicted high probability of marten occurrence within Lassen Volcanic National Park and the Caribou Wilderness as well as areas on the Lassen NF that were adjacent to those two areas. In addition, one small area of high-probability habitat was located in the Thousand Lakes Wilderness, and a yet-smaller area on Burney Mountain. A large area of mostly moderate probability was located in the southern portion of the Forest.

The winter model predicted a similar distribution of marten occupancy as the summer model, but with nearly four times more area on the Forest predicted to have high probability of occurrence. The winter model tended to show more habitat at lower elevations than did the summer model. This suggests that summer habitat may be more limiting to marten on the Lassen NF, that during winter marten may shift or expand their home ranges downslope into a broader range of habitats, or that winter expansions may represent individuals dispersing from summer (breeding) habitat areas. The model using year-round survey data predicted a similar distribution of high probability marten habitat as did the winter model.

Specific to the Eiler Fire area, the three models predicted similar high probability areas, with summer, winter and year-round habitat highlighted in the Thousand Lakes Wilderness and adjacent Roadless Area, with a smaller patch on Burney Mountain. One area identified as high-probability habitat in the summer model that did not appear in the other two models was a small area of habitat immediately west of Cornaz Lake. In all models, low probability habitat occurred throughout the remainder of USFS lands in the Eiler Fire perimeter.

Marten connectivity across the Lassen NF was also modeled in 2010 (Kirk and Zielinski 2010) using least-cost corridor modeling. Least-cost corridors depict a cost-weighted distance of movement between two locations rather than a straight-line distance. Pathways identified in this manner are thought to provide the best opportunities for successful dispersal events between populations. The resulting corridor was divided into six “linkages”, or segments, which bridged the areas between reserves, such as wilderness areas and Lassen Volcanic National Park, as well as a known marten population at the Plumas-Tahoe NF boundaries. Linkage 2 bridged north-to-

south between the Mt. Shasta Wilderness and the Thousand Lakes Wilderness. This Linkage 2 represented the longest dispersal distance between reserves, being approximately 132 km (82 miles) in length. This linkage also contained the most severe bottleneck in terms of corridor width, which occurred on private lands near the town of Burney, located north of the Eiler Fire area. In this area of Linkage 2 dispersal options were constrained by poor habitat permeability, lower elevation and two major highways. Linkage 2 was comprised of the least amount of predicted reproductive habitat (24 percent) within the identified linkages, and distances between habitat patches was greatest within this linkage. As a result of these factors, Linkage 2 was considered the most tenuous of the linkages between marten populations. The Eiler Fire encroached into the eastern margin of this linkage, as discussed below in the Effects section.

The Lassen NF's LRMP established a network of fisher and marten habitat management areas (HMAs) and connecting corridors that stretch north to south across the Forest. Within the Logan Management Area, in which the Eiler Fire is located, five marten HMAs were designated. Of these five HMAs in the Management Area, the Eiler Fire burned within two, Burney Mountain East and Burney Mountain South. The fire burned 995 acres (85 percent) of the 1,175 acre Burney Mountain East HMA, and 125 acres of the Burney Mountain South HMA. Almost all the forested habitat within these HMAs was burned at high intensities. Due to this, these burned areas, including essentially all of the Burney Mountain East HMA, have been rendered unsuitable and no longer meet LRMP habitat objectives. No opportunity exists to remap the burned green forest habitat within the Burney Mountain East HMA due to adjacent private lands and extensive non-forested areas at higher slopes on Burney Mountain.

Moriarty (2014) studied marten habitat use and movement behavior on the Lassen National Forest. Marten were found to select home ranges with fewer openings than available on the landscape, and within their home ranges selected complex patches over simple patches and openings. Moriarty further found that marten selected complex forest patches and avoided both simple (including thinned) forest patches and openings (including group selections). With a baited incentive marten were more likely to enter simple patches and openings during winter when deep snow may have limited the presence of predators such as bobcats. Telemetry showed that without a baited incentive, in both winter and summer marten preferred complex stands, avoided simple stands, and strongly avoided openings. Marten avoided structurally simple forest stands year-round, but were willing to travel through them quickly. Simple patches were not avoided as strongly as openings, but these stands also were not used for foraging, resting or denning. Moriarty's study (2014) suggested that structurally simple stands and openings, often created as a result of fuel reduction treatments, substantially reduced the functional connectivity of landscapes for marten.

In recent years marten have been confirmed on Burney Mountain and in the Thousand Lakes Wilderness during surveys conducted by the State (Pete Figura, personal communication, 2014). In the fall of 2014, ten survey cameras were operated for a month by the USFS around the

perimeter of the Eiler Fire. A marten was photographed by one of these ten cameras, located at the eastern edge of the Thousand Lakes Wilderness, approximately 0.4 miles south of the fire perimeter (see Table 3 below).

Table 3. Carnivore and mustelid species detected at 10 remote camera stations operated adjacent to the Eiler Fire perimeter, 19 November to 18 December, 2014.

Species	Number of camera stations at which species detected
Gray Fox	9
Bobcat	5
Coyote	5
Striped Skunk	4
Mountain Lion	2
Marten	1
Spotted Skunk	1

American Marten

Environmental Effects: Alternative 1 – Proposed Action

Direct and Indirect Effects

Prior to the fire, approximately 3,359 acres of CWHR 4M, 4D, 5M and 5D existed within mixed-conifer, white fir and red fir forest types. As analyzed in the Eiler Fire Project Silviculture Report (Project record), the Eiler Fire reduced the amount of this habitat to about 240 acres, which represents about a 93 percent reduction of this habitat.

Most of the pre-fire habitat was in the southern portion of the fire within the Thousand Lakes Wilderness and Inventoried Roadless Area, and on the eastern slopes of Burney Mountain. There was a lack of suitable marten habitat on the east side of the fire perimeter (lower elevation, drier sites with extensive brushfields) and within the isolated USFS lands within the interior of the fire that were also fragmented by brushfields and lava flow areas and surrounded by private timber lands. The only identified red fir stands within the fire perimeter were within the southern portion of the fire within the Wilderness and Inventoried Roadless Areas, and at the upper elevations of Burney Mountain. It was in these areas where marten presence has been detected in the past.

These patterns of available habitat are consistent with the CBI model of marten habitat prepared for the Lassen NF (Rustigian-Romsos and Spencer 2010), which indicated areas of high probability marten habitat in the Thousand Lakes Wilderness Area as well as a smaller area on Burney Mountain. The proposed action would largely restrict proposed actions from the southern portion of the fire within the Wilderness and the adjacent Inventoried Roadless Area. There would be no actions within the Roadless Area, and within the Wilderness only the abatement of hazard trees along trails or camp sites. Therefore, this area of known marten habitat would be only slightly affected by the proposed action.

On Burney Mountain, pre-fire habitat was represented by areas of mature forest separated by talus patches. As previously mentioned a LRMP-designated marten HMA was located in this area. This area burned primarily at high intensities and what green forest remains is highly fragmented and in small patches. Due to lack of access and steep slopes helicopter salvage harvest is proposed for about 434 acres in this area, plus one 30 acre unit proposed to be harvested by on-the-ground machinery. During the planning process, another 270 acres of burned forest were dropped from proposed helicopter logging in this area in order to provide burned forest habitat. As per project design, the areas proposed for helicopter harvest would retain about 100 square feet of snag basal area per acre in diameters over 10" DBH, as well as the available snags <10" DBH. The upper range of diameters to be retained would vary by unit. While the very largest trees in these helicopter units would be harvested, an abundance of snags would remain as habitat.

In addition, the proposed action would reforest the helicopter units to 'founder stands', which are small patches of about an acre in size that combined would represent about 5-10 percent of the acres within each unit. Within these patches additional snags would be removed in order to prepare for planting and for worker safety. Due to the high severity nature of the Eiler Fire in this area, these founder stands would return forested cover more quickly than would otherwise occur. These helicopter units would thus retain a large number of snags as well as unaltered understory vegetation within 90-95 percent of the units, and, in the future, small patches of conifers within the other 5-10 percent. As such they would likely represent at least summer habitat for marten in the short- and long-term (Koehler and Hornocker 1977), similar to the pattern of use found by Ellis (1998) within shelterwood units of Swain Mountain. Winter use by marten may not occur (Koehler and Hornocker 1977) as burned snags topple due to lack of overhead cover during winter months when shrubs and many of the downed logs would be covered by a snowpack, eliminating overhead cover in large areas. While harvest would affect the quality of habitat within this area due to removal of the largest snags, at least seasonal use by marten would still likely occur. Reluctance of marten to use these large burned areas may still occur in time regardless of the limited salvage harvest given the potential lack of overhead cover after the burned snags fall due to decay. The proposed action would also return patches of conifers to this area more quickly than would occur in either Alternative 3 or the No Action alternative.

As stated in the Existing Environment, the low to moderate burn severity effects are generally found on the outer edges of the fire with an average patch size of 35 acres. High severity burn effects, which account for the majority of the burned area, are found more in the interior of the fire with one patch exceeding 17,700 acres, and an average patch size of 214 acres. As such, only a small amount of green forest habitat survived the fire, and in the interior of the fire the patches that did are small and highly fragmented. Removal of dead and dying trees from within or from the edges of these patches would not be expected to change the CWHR classification of these areas, thus salvage harvest would not be expected to reduce the acres of any remnant patches of

green forest habitat. Thus no surviving marten habitat would be rendered unsuitable by the proposed action. Given the lack of marten detections within the interior of the fire, the small, fragmented nature of low to moderately burned habitat, and the large areas of private lands that were burned at high intensities that surround USFS parcels within the fire interior, potential use of USFS lands within the fire interior by marten is not likely other than as possible short-term dispersal habitat.

Habitat elements such as snags and future downed woody debris would be reduced within tractor salvage units, and may reduce the quality of salvage units for marten habitat in the short-term. However, salvage units are focused predominantly in larger patches of forest which burned at moderate to high fire severity and are not within largely contiguous green forest patches. Because the proposed tractor salvage units are primarily within high severity burn areas and in the interior of the fire, the degree of the short-term effects to overall habitat quality from the removal of dead and dying trees in the proposed salvage units would be expected to be relatively minor due to the general lack of marten habitat prior to the fire. Follow-up site preparation and tree planting within salvage units would accelerate the re-establishment of forested conditions within treatment units sooner than under the no action alternative. Given a very small amount of management actions proposed within areas important for marten, and the general lack of habitat within the interior of the fire on USFS lands even prior to the fire, this alternative and its design features should not represent a substantive effect to marten habitat within the fire area.

Of the 14,926 acres that burned on USFS lands, this alternative proposes reforestation on approximately 5,645 acres within sites prepared by salvage harvest and fuels treatments, Reforestation thus represents about 38 percent of the burn acreage, leaving most of the burned area to recover on its own. Together, the design features related to snag retention and reforestation will serve to retain many of the features that would maintain habitat components for many prey species (snags and subsequent patches of downed logs, and an abundant understory vegetation including abundant shrubs and herbaceous vegetation) while still allowing multiple-use objectives to be met within the burned area. As described, management actions would be limited in the two areas of most importance to marten (the southern portion of the fire and Burney Mountain), with limited hazard tree removal, reduced salvage within helicopter units, and reforestation being limited to founder stands on Burney Mountain.

The proposed hazard tree removal along approximately 1,174 acres of roadside corridors would not change the CWHR classification (CWHR type, size, or canopy cover) of remnant patches of green forest, and there would not be a reduction in the amount of suitable green forest habitat from hazard tree removal. The removal of hazard trees would reduce the amount of snags within the fire footprint on USFS lands, and in the long term would reduce the amount of large woody debris reaching the forest floor. The reduction of these habitat elements along roads has the potential to cause slight effects to prey populations in the short and long term. Retention of

downed logs in treatment units where available will moderate the potential for effects to prey populations.

The 361 acres of Baker cypress treatments would occur within existing pine plantations. These pine plantations were old brushfield conversions that were initially developed in the 1930s. The presence of these brushfields was noted by General Land Office surveyors in 1881, and was recognized as reflecting a long history of past fires (Dunning and Kirk 1939). No mature forest occurs within these plantations, and, due to the lack of density and forest structure, these areas did not represent quality marten habitat prior to the fire. Therefore, the proposed Baker cypress treatments would not substantively affect marten habitat.

American Marten

Alternative 1 – Proposed Action

Cumulative Effects

The cumulative effects analysis area for American marten for this and all alternatives was expanded from USFS lands to include the entire Eiler Fire footprint, as well as a marten travel corridor that was previously mapped along the west side of the Fire using least-cost corridor modeling (Kirk and Zielinski 2010), as described above in the species account. This corridor, "Linkage 2", bridged north-to-south between the Mt. Shasta Wilderness and the Thousand Lakes Wilderness. The Eiler Fire encroached into the eastern margin of this linkage. Therefore the cumulative effects analysis area was further expanded to include the remaining USFS lands identified within the corridor located between the Thousand Lakes Wilderness to the south, and north to the USFS-private land boundary on the north side of Burney Mountain. The mapped corridor (Kirk and Zielinski 2010) in this area occupies the same area on USFS lands as the LRMP-designated network of HMAs and connecting corridors.

Within the fire perimeter, the primary actions that could represent cumulative effects are fire salvage and reforestation actions on private lands that were burned, fuelwood harvest on USFS lands, and hazard tree removal along the Highway 89 corridor.

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most of the burned forest habitat on private lands. Similar to the effects on USFS lands, much of private timber lands burned at high severity and little green forest remains. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, burned forest habitat will be removed. However, little green forest habitat existed prior to the fire in these areas, in part due to past timber harvest, and in part due to private land typically being at lower elevations than the USFS lands. Essentially all the high probability marten habitat predicted by modeling

(Rustigian-Romsos and Spencer 2010) was located on USFS lands. Thus, this expected loss of burned forest habitat should not constitute a substantive cumulative effect on USFS lands.

Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are generally with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would likely be much less understory vegetation within reforested areas on private lands than on USFS lands, and thus the assemblage of prey species that would occur on private lands, and their abundances, would differ from that on USFS lands. Species composition and density of the conifers within the planted areas would also likely differ. However, given the proposed action and its consideration of the value of understory vegetation in its design (see discussion in Direct and Indirect Effects, above) this should not represent a substantive cumulative effect for this species. Varying tree species composition and densities of reforested areas across ownership boundaries would help foster future forest heterogeneity and avoid the homogeneity that would occur if all acres were planted to the same schemes and objectives.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to travel off road to access snags. Due to woodcutting activity in the fall of 2014, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags retained from salvage harvest would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be "pervasive" along roads of both fires.

As observed by Siegel et al (2013), fuelwood harvest would primarily be along roads, as well as in relatively flat areas that allow off-road travel, such as along user-created roads, post-harvest skid trails, or along meadow edges. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. Also, there would be no fuelwood harvest within the Wilderness or Inventoried Roadless Area due to lack of access. Therefore the two areas of most importance to marten, Burney Mountain and the southern portion of the fire, would generally be unaffected by fuelwood harvest.

As part of the design of this project, snag retention clumps were not placed within about 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus retained snag patches would be removed from roadsides and less accessible than if they were located adjacent

to roads. The presence of stumps along roadside corridors may also make off road travel difficult. Inevitably some retained snags within treatment areas will likely be removed by fuelwood harvesters. However, given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, many areas would be inaccessible to woodcutters. Also, because Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway as part of this proposed action. Thus this activity should not result in a substantial decrease in snags across all USFS lands involved in the fire.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All these sites are in developed locations along or within the Highway 89 corridor. Due to the developed, high-use nature of these sites, and the small acreage involved, and the location of these areas being in lower elevations than marten would be expected to inhabit, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Functional habitat connectivity for martens on the Lassen NF has been assessed using GIS cost-distance and least-cost corridor modeling (Kirk and Zielinski 2010). This effort involved two primary steps. First, the landscape was modeled as a permeability surface, which described the relative costs to dispersing martens for moving across each linkage from known source and destination locations. Resistance costs were assigned to different landscape features, primarily vegetation types, which allow behavioral responses to unsuitable habitat to be modeled in a biologically realistic manner. Landcover was considered the primary influence on animal movements. Second, least-cost algorithms were used to determine the least-cost movement corridors, using the "corridor" function, and least-cost path, using the "costdistance" function (see Kirk and Zielinski 2010 for a full description). Dispersal corridors calculated using the "costdistance" and "corridor" functions mapped every possible movement pathway across the landscapes defined by each linkage. Corridors with the lowest total resistance costs were assumed to be the most essential for successful movement. Corridors that depicted the most likely dispersal routes, the top 10 percent and 25 percent, respectively, were extracted from the model. The top 10 percent corridors were generally within the middle of the wider 25 percent corridors. See Figure 4 in the Appendix for the location of the least-cost path corridors in relation to the Eiler Fire.

Within the cumulative effects analysis area, the 25 percent corridor extending from the Thousand Lakes Wilderness to the north edge of FS lands on the northern side of Burney Mountain was about 7.5 to 9.5 miles wide. The Eiler Fire burned along the eastern portion of this 25 percent corridor, affecting about half the mapped width of the corridor. The total remaining 25 percent corridor to the west of the Eiler Fire footprint is about 4 to 5 miles in width, and is

about 2 to 4 miles wide on USFS lands. The Eiler Fire burned within the 10 percent least-cost corridor in the Burney Mountain area. In this location the 10 percent corridor is essentially contained within the parcel of USFS lands centered on Burney Mountain. In this area the 10 percent corridor was mapped at about 3.5 miles in width. The fire burned along the eastern portion of this area, and affected about 0.5-1.2 miles of this width, or about a third of the mapped 10 percent corridor.

Within the least-cost pathways model, chaparral was given a high "cost" value, indicating marten would have difficulty traveling through large shrubfields. Therefore, due to the high severity nature of the Eiler Fire the portions of the 10 percent and 25 percent corridors within the Eiler Fire footprint have likely been compromised in their ability to provide for marten connectivity at least until there is a return of sufficient forest cover to the area. This puts more importance on the remaining corridor on USFS lands to the west of the fire to provide for north-south connectivity. The primary project in this area is the aforementioned Whittington Project. The Whittington Project was a project authorized under the HFQLG planning period. As per Regional direction (USDA 2004) land allocations for marten and fisher habitat management areas were not applied during the HFQLG planning period, therefore the Whittington Project did not address potential effects specific to these LRMP-designated land allocations. See Figure 4 in the Appendix for the location of the Whittington Project in relation to marten least-cost pathway corridors and the LRMP-designated HMAs.

Much of the Whittington Project (about 3,275 acres) is located within two existing pine plantations. These pine plantations were old brushfield conversions that were initially developed in the 1930s. The presence of these brushfields were noted by General Land Office surveyors in 1881, and were recognized as reflecting a long history of past fires (Dunning and Kirk 1939). The interiors of these brushfields were mapped out of the 25 percent corridor, and thus were not considered by the model to contribute to marten movement. These brushfields, which are oriented in a southeast-northwest angle, exist between the Wilderness and Burney Mountain, and may have hindered north-south movement of marten in this area for over a century. A gap of mature forest of about 0.5 miles in width separates these two brushfields. The Whittington Project would thin the pines in these plantations and mastication of the brush would occur. In non-DFPZ areas, mastication within the plantations would leave up to 25 percent of the brush unmasticated in order to protect Baker cypress and to provide for wildlife refugia (Harville 2012). In addition, a DFPZ portion of the plantation immediately adjacent to the west side of the 0.5 mile gap would masticate all brush for about 0.5 miles into the plantation. These treatments in the long-term may serve to enhance marten habitat and connectivity by promoting and protecting the conifer component within these old brushfields. However, in the short-term by eliminating or reducing the brush component and by thinning the available trees, these treatments would likely limit marten travel through this area until such time as overhead cover increases within the treated area.

As mentioned, a gap of mature forest cover of about 0.5 miles in width separates these two brushfields. The 10 percent least-cost corridor narrows and passes through this gap; this represents the narrowest width of the 10 percent corridor in the area. Due to the surrounding plantations, and now the Eiler Fire to the east and private lands to the southwest and west, this gap is important to marten connectivity through this area. The narrowest portion of this gap is fully occupied by the Burney Springs spotted owl PAC, which was avoided by Whittington Project treatments. Also avoided were the areas north of the plantations along the lower flanks of Burney Mountain. However, the Whittington Project includes about 389 acres that is within this area immediately south of the narrowest part of the gap between the two plantations. This is the same Whittington area discussed under cumulative effects for California spotted owls, above.

As previously discussed in the spotted owl account, within these acres the Whittington Project would implement thinning (Treatment A) and group selections. Treatment A was described as thinning to "…improve fire resistance, increase lateral and vertical structural diversity, and move forested areas towards a more historical species composition by releasing healthy desirable trees (ponderosa/Jeffrey pine, sugar pine, Douglas fir, hardwoods) and reducing inter-tree competition for site resources. The average desired stocking level (basal area) would range from 120 square feet to 180 square feet per acre, based on species composition and location. Tree spacing would be variable and would include small openings and clumps of denser trees throughout the stands. Only trees less than 30.0 inches DBH would be removed." See the previous discussion in the spotted owl account for a more detailed account of the potential treatments. The number of group selection units to be located in this area was not established.

Some thinning to create DFPZs was proposed on the northwest side of the western plantation, and to the east and northeast of the eastern plantation. Much of the areas proposed for DFPZs to the east of this eastern plantation were burned in the Eiler Fire before the thinning took place. Thinnings within DFPZs would retain, on average, a canopy cover of 40 percent within 5M, 5D and 6 forest stands.

Overall, the proposed treatments would reduce the amount of dense-canopied habitat (4D, 5D and 6 stands) by 30 percent within the Whittington project area, from about 3,319 acres to 2,312 acres (Harville 2012). These acres would be reduced to M strata due to reductions in canopy closure. The effects of the proposed 80 acres of group selections were not discussed. The BE did weigh the tradeoffs between short-term reductions in habitat with the long-term reductions in the risk of wildfire. The BE states that, "The overall effect of the management is to create greater forest heterogeneity and move the forest into a greater ecological resiliency. The loss of denning habitat must be weighed against the maintenance of a habitat that is better capable of sustaining low intensity wildfire, as well as surviving other threats from insects, disease, and drought. If fuels are not reduced, denning habitat could be lost within the next few years as a result of severe stand changing fire" Harville 2012). And, "One of the major purposes of the proposed project is to reduce forest fuel buildup that accumulates without the historic fire frequency of 15-20 years

for the area. If a wildfire were to occur in the project area following the implementation of the proposed action, there would be less of an impact on habitat than if a fire were to occur without implementation of this alternative" (Harville, 2012). The feared large-scale effects of wildfire were realized by the Eiler Fire.

Regarding connectivity, the BE states that the various reductions in habitat would restrict future marten movements to late-succession habitat and occupancy within the analysis area to PACs and SOHAs. The BE further states that, "Presently there is the existence of a network of SOPACs, SOHAs (soon to be HRCAs), and gPACs that maintain habitat connectivity across the Forest north to south from Lassen Volcanic National Park to Burney Mountain…. As a result the habitat connectivity in a north south direction at these sites would be maintained." However, effects specific to the modeled travel corridor were not addressed. Also, Moriarty (2014) found that on the Lassen NF, marten selected complex forest patches and avoided both simple (including thinned) forest patches and openings (including group selections). Marten avoided structurally simple forest stands year-round, but were willing to travel through them quickly. Simple patches were not avoided as strongly as openings, but these stands also were not used for foraging, resting or denning. Moriarty's study (2014) suggested that structurally simple stands and openings, often created as a result of fuel reduction treatments, substantially reduced the functional connectivity of landscapes for marten. Elevated risk of predation was considered to be the reason that marten avoided structurally simple stands. Thus treatments associated with the Whittington Project, such as DFPZs and group selections, that simplify stand structure or create openings may affect the functional connectivity of marten habitat in this area.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat due to the project avoiding substantive effects to areas within the fire important to marten (Burney Mountain and the southern portion of the fire). Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands would not represent substantive cumulative effects.

The primary impacts to marten habitat were caused by the Eiler Fire itself. Prior to the fire, approximately 3,359 acres of CWHR 4M, 4D, 5M and 5D existed within mixed-conifer, white fir and red fir forest types. As analyzed in the Eiler Fire Project Silviculture Report (Project record), the Eiler Fire reduced the amount of this habitat to about 240 acres, which represents about an 93 percent reduction of this habitat.

Reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to marten habitat and marten connectivity within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire. The potential of future thinning, DFPZ and group selections treatments within the bottleneck of the

least-cost pathways corridor as well as the LRMP-designated network of HMAs and connecting corridors could, along with the Eiler Fire itself, serve to cumulatively decrease the connectivity of marten habitat within this area outside of the fire footprint.

Alternative 1. Summary of direct, indirect and cumulative effects, and viability determination – American marten

Prior to the fire, approximately 3,358 acres of CWHR 4M, 4D, 5M and 5D existed within mixed-conifer, white fir and red fir forest types. Most of this habitat was in the southern portion of the fire within the Thousand Lakes Wilderness and Inventoried Roadless Area, and on the eastern slopes of Burney Mountain. The Eiler Fire reduced the amount of this habitat to about 240 acres, which represents about a 93 percent reduction of this habitat.

Given the lack of marten detections within the interior of the fire, the small, fragmented nature of low to moderately burned habitat, and the large areas of private lands that were burned at high intensities that surround USFS parcels within the fire interior, potential use of USFS lands within the fire interior by marten is not likely other than as possible short-term dispersal habitat. Given a very small amount of management actions proposed within areas important for marten, and the general lack of habitat within the interior of the fire on USFS lands even prior to the fire, this alternative and its design features should not represent a substantive effect to marten habitat within the fire area.

Reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to marten habitat and marten connectivity within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire. The potential of future thinning, DFPZ and group selections treatments within the bottleneck of the least-cost pathways corridor as well as the LRMP-designated network of habitat management areas and connecting corridors could, along with the Eiler Fire itself, serve to cumulatively decrease the connectivity of marten habitat within this area outside of the fire footprint.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat due to the project avoiding substantive effects to areas within the fire important to marten (Burney Mountain and the southern portion of the fire). Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands would not represent substantive cumulative effects. The primary impacts to marten habitat were caused by the Eiler Fire itself. Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of American marten, but was not likely to result in a trend towards federal listing or loss of species viability.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project may affect individuals of American marten, but is not likely to result in a trend towards federal listing or loss of species viability.

American Marten

Environmental Effects: Alternative 2 – No Action

Direct, Indirect and Cumulative Effects

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with most of the fuelwood activity confined to roadsides or other accessible areas. Such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres, snags would remain until they toppled due to decay, and burned-area vegetation would go through natural recovery. As such, there would be little potential for disturbance to foraging marten.

Most of the current levels of large woody debris and snags would be maintained on USFS lands, and may provide enhanced short-term foraging opportunities for marten, at least in the summer season. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to seed back in to initiate natural reforestation.

Given the overall lack of salvage on USFS lands, the salvage harvest on private lands would represent less of a cumulative effect. Private-land salvage will be followed by reforestation efforts on the same lands. Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire on private lands, and hastening a return of forested cover within the footprint of the fire. For marten this would not be as important of a factor as for other species since much of the area of private land is outside of areas predicted as high suitability marten habitat, but these plantations, once mature, could provide for greater connectivity through this area.

The potential cumulative effects of the adjacent Whittington Project and hazard tree removal within the Highway 89 corridor would remain as described for Alternative 1.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10

years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand outside the Eiler Fire footprint and cause a further loss of marten habitat outside of the Eiler Fire perimeter, and possibly further constrain marten connectivity in this area.

American Marten
Environmental Effects: Alternative 3
Direct and Indirect Effects

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Within approximately 1,095 acres of roadside corridors, saw-timber sized hazard trees along roads would be felled and commercially removed, while submerchantable trees along roads may be felled and left as logs or piled and burned. Hazard tree abatement would thus cause a minor reduction in the overall total of burned forest habitat on USFS lands within the Eiler Fire. Relatively few of the 14,926 burned acres on USFS lands would be affected. Over the majority of the burned acreage snags would remain until they toppled due to decay. Given the restriction of timber harvest to road corridors, there would be little potential of disturbance to foraging marten. Due to the lack of reforestation activities, burned-area vegetation would go through natural recovery; in terms of vegetative recovery this alternative would be the same as the No Action. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to seed back in to initiate natural reforestation.

Existing levels of large woody debris and snags would be maintained outside of road corridors, and may provide enhanced short-term foraging opportunities to marten, particularly adjacent to suitable, unburned forest habitat.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

American Marten: Alternative 3
Cumulative Effects

The cumulative effects analysis area is as described under Alternative 1.

Due to the lack of salvage harvests other than roadside hazard tree removal in this alternative, potential for adverse cumulative effects of salvage harvest on private lands are further reduced as compared to Alternative 1. In contrast, given the lack of reforestation in this alternative, and as stated under Alternative 2, private land reforestation efforts within the Eiler Fire would gain

importance as a means of hastening the restoration of forest cover and potential marten habitat within the footprint of the fire. Accessible logs and snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. However, since the effects of woodcutting may be most pervasive along roads (Siegel et al 2013), and it would be in these areas that hazard trees would be removed commercially anyway as a result of this alternative, the effects of woodcutting would be much diminished.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. The limited treatments proposed within this alterative of the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive.

The cumulative effects of the Whittington Project, and removal of hazard trees along the Highway 89 corridor, would be as described for Alternative 1.

Alternative 3. Summary of direct, indirect and cumulative effects, and viability determination – American marten

In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Relatively few of the 14,926 burned acres on USFS lands would be affected. Over the majority of the burned acreage snags would remain until they toppled due to decay. Due to the lack of reforestation activities, burned-area vegetation would go through natural recovery; in terms of vegetative recovery this alternative would be the same as the No Action.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. The limited treatments proposed within this alterative of the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive. The cumulative effects of the Whittington Project would be as described for Alternative 1, and the lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project may affect individuals of American marten, but is not likely to result in a trend towards federal listing or loss of species viability.

Pallid Bat

Existing Condition: species and habitat account

In 2001-2004, bat surveys using mistnets were conducted on the adjacent Eagle Lake RD (ELRD). Approximately 80 sites were surveyed and approximately 2,613 individual bats were trapped. Pallid bat individuals were caught at 37 of these sites, none of which were located within the Eiler Project area. In addition, 13 pallid bat maternity roosts were located on the ELRD using radio-telemetry. All of the maternity roosts were in trees, including one aspen, three incense-cedars, eight ponderosa and one Jeffrey pine. Average diameter of the roost trees was 30.3" DBH, the smallest diameter roost was the 12.7" DBH aspen; the smallest diameter conifer roost tree was a 23.5" DBH ponderosa pine. None of these roosts were located within the Eiler Project area. Results of this survey effort indicated that pallid bats were most common in the lower, drier forest types, such as eastside pine.

Pallid bats roost in caves, rock and cliff crevices, as well as in snags or green trees which provide a roost structure such as a cavity or other deformity, and can be found in forested habitats including mixed-conifer forests. Primary prey species are large, terrestrial arthropods, such as scorpions, ground crickets and beetles (Hermanson and O'Shea 1983). The pallid bat is primarily a gleaner that typically forages close to the ground at distances < 3 km from roosting sites (Barbour and Davis 1969, O'Shea and Vaughan 1977, Bell 1982, Johnston and Fenton 2001, all cited in Baker et al 2008).

Conservation measures for this species include reducing overstocked stand conditions and implementing vegetation treatments to create open understories that allow for unencumbered flight (USDA 2001). Pallid bats tend to be more prevalent within edges, open stands and open areas without trees (USDA 2001).

Within the lower elevations of the project area, foraging habitat is likely provided where ponderosa pine predominates or in areas with a mixture of black oaks, riparian areas, meadows, and open forested stands. Large rock outcrops, snags and other trees with suitable roosting structures would likely provide roosting habitat.

Pallid Bat

Environmental Effects: Alternative 1 - Proposed Action

Direct and Indirect Effects

Bats, including pallid bat, have been shown to respond positively to wildfire, including high-severity wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013), observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags.

In the Buchalsky et al (2013) study, pallid bats showed a positive response to fire, with no differentiation in activity between moderate and high severity fire areas. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities. The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. As a result, multiple design features were built into this alternative in order to balance the retention of these features while still meeting multiple-use objectives on FS lands burned by the Eiler Fire. These are discussed below.

Proposed in this alternative are 2,567 acres of ground-based salvage, 517 acres of mechanical fuels and 3,602 acres of hand fuels treatments. In all of these treatments, totaling 6,602 acres, approximately 25 percent of each treatment type would be retained in un-harvested or untreated patches. This amounts to about 1,611 acres that would remain in its existing condition relative to snag densities, and which would provide snag roosting habitat for this species.

In addition, the proposed snag retention within the 481 acres of helicopter harvest units would retain approximately 100 square feet of snags over 10" in diameter. During the design of this project, about 549 acres of proposed helicopter units were dropped from the proposed action in order to maintain burned forest habitat. While about 5-10 percent of the proposed helicopter units, as well as some of the dropped units, totaling over 1,000 acres, would be reforested to founder stands, the remaining 90-95 percent of these areas would still provide an abundance of snags and roosting habitat for this species.

Additionally, there would be no salvage harvest within the 2,226 acres of the inventoried Roadless Area on the north side of the Thousand Lakes Wilderness, and only site-specific hazard tree elimination within the 1,730 acres that burned within the Wilderness, these 3,956 acres would provide an abundance of potential roost trees for this species.

Also, an additional 1,103 acres of the fire burned in a Roadless Area on the east side of Highway 89 in a sparsely vegetated lava flow. While these acres do not represent burned forest per se, there is a scattering of fire-killed trees, and a stringer of trees along Hat Creek that flows through one of these areas, that would provide potential roost trees for this species. An additional 425 acres of sparsely forested lava flow areas exist within the body of the burn perimeter, which will be neither salvaged nor reforested, and again will provide potential roost trees for this species. These lava flow areas total about 1,528 acres.

Thus, about 8,000 acres of fire-killed snags would remain unharvested or lightly harvested in this alternative, representing about 53 percent of the USFS lands burned by the Eiler Fire. We recognize that actions proposed in the Eiler Fire (such as commercial salvage harvests and site preparation activities) will cause a reduction in snag habitat in order to meet desired conditions

and objectives within these areas. However, design features built into the proposed actions will assure that snags will be retained across a substantial area of the fire.

Of the 14,926 acres that burned on USFS lands, this alternative proposes reforestation on approximately 5,645 acres within sites prepared by salvage harvest and fuels treatments. Reforestation thus represents about 38 percent of the burn acreage on USFS lands, leaving most of the burned area to recover on its own. In addition, of the acres of proposed reforestation there would be about 1,056 acres planted to founders stands, in which trees would be planted in about 5 to 10 percent of the unit acres. Another 2,255 acres would be planted to cluster planting, and the design of the conventional reforestation includes some areas of wide spacing. Cluster planting and wide-spaced conventional planting would leave larger gaps between planted trees than in traditional reforestation. This wider spacing ensures that reforestation-related activities would retain more non-coniferous vegetation within these units than would be retained by traditional reforestation techniques. In addition, planting densities would generally be lower and trees more widely spaced in areas containing black oaks, and conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall. Reforestation of conifers would also not occur within 150 feet of aspen and cottonwood communities on the east, south, and west sides of the community, or 100 feet on the north side to maximize light to the stand and allow for expansion. Reforestation would not occur within 50 feet of a meadow edge, and when along stream channels and seasonal wetlands with existing riparian communities reforestation of conifer species would not occur within 20 feet of the riparian plant community. All of these strategies to alter planting densities in or near oak, aspen, cottonwoods, meadows, stream channels and seasonal wetlands would serve to retain and promote understory vegetation. In addition, 25 percent of tractor harvested units that are to remain unharvested would also remain unforested. Given all the above, with reforestation representing about 38 percent of burned area on USFS lands, and the techniques of reforestation being proposed, an abundance of understory vegetation promoted by the high-severity fire will be retained through time.

Together, the design features related to snag retention and reforestation would serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area. While salvage operations and removal of fire-killed trees would reduce habitat for potential prey species such as wood-boring and bark beetles, the combination of snag retention and unharvested areas, as well as the increase in understory vegetation would still provide for greater insect prey abundance than what likely occurred pre-fire.

The primary potential for direct effects to pallid bats is disturbance to roosting individuals during salvage operations. Pallid bats are considered to be sensitive to roost site disturbance (Zeiner et al 1990), and may locate their roosts low in snags in basal scars (Baker et al 2008). Thus there is potential for the flushing of this species from roost trees as salvage operations occur

adjacent to a roost snag. There may also be some potential for mortality if roosting trees are removed while bats are roosting within them, though this is unlikely for adults as sensitivity to disturbance would likely cause the bats to abandon roost sites prior to tree falling.

In addition to tree roosts, pallid bats may also roost within crevices within rocks (Zeiner et al 1990, Baker et al 2008). The volcanic flow areas common within the footprint of the Eiler Fire, and the large expanses of talus slopes on Burney Mountain may also provide roost habitat for this species. And, as discussed above, there will remain a large number of acres of undisturbed fire killed trees that would provide undisturbed snag habitat. Therefore, potential for direct effects of this project, while present, are likely not substantial for this species.

The 361 acres of Baker cypress treatments would occur in existing pine plantations. No mature forest occurs within these plantations, and due to the small size of the planted pines there were likely few opportunities for pallid bat roosting structure within the plantation trees prior to the fire. Therefore, the proposed Baker cypress treatments would not substantively affect pallid bat habitat.

Pallid bat

Environmental Effects: Alternative 1 – Proposed Action

Cumulative Effects

The cumulative effects analysis area for pallid bat for this and all alternatives was expanded from the USFS lands within the fire perimeter to the larger Eiler Fire footprint in order to consider activities on private lands burned by the Eiler Fire that are adjacent to USFS lands. The analysis area was not expanded further because, 1) no spatially-oriented standards and guidelines or LOPs are associated with this species, 2) individuals do not have defined spatial territories that can be mapped or assessed, and, 3) there are no areas adjacent to the Eiler Fire area that represent unique habitat opportunities for these species that would warrant expanding the project area to include. The activities within the Eiler Fire footprint that would represent cumulative effects to this species and its habitat include salvage and reforestation on private lands burned by the fire, removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center), and personal fuelwood harvest on USFS lands.

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most potential snag habitat for this species. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees of sufficient size to represent potential roosts will likely be removed. However, due to snag habitat being considered during the planning and design of actions on USFS lands (see discussion above in Direct and Indirect Effects), this

expected loss of roost habitat should not constitute a substantive cumulative effect on USFS lands.

Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are generally with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would likely be much less understory vegetation on private lands than on USFS lands, and thus less potential for private land to contribute to a post-fire increase in insect prey relative to USFS lands. However, given the proposed action and its consideration of the value of understory vegetation in its design (see discussion in Direct and Indirect Effects, above) this should not represent a substantive cumulative effect for this species.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of these sites are in developed locations along or within the Highway 89 corridor. Due to the developed nature of these sites, the routine identification and removal of hazard trees, including snags and structurally defective trees from these high-use areas, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Personal fuelwood harvest would occur within the Eiler Fire footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags retained from salvage harvest would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads of both fires.

Fuelwood harvest would primarily be immediately along roads in relatively flat areas that allow off-road travel, along user-created roads, post-harvest skid trails, meadow edges or other features that allow off-road travel. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would be avoided. As part of the design of this project, snag retention clumps were not placed within about 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus, retained snag patches will be somewhat removed from roadsides and should be less accessible. The presence of

stumps along roadside corridors may also make off road travel difficult. Also, because Siegel et al (2013) indicated the main woodcutting activity in the fires they monitored was along roads, and since it is along roads that hazard trees will be felled and removed as part of this alternative, the greatest proportion of snags that would most likely be vulnerable to woodcutters would be removed anyway.

Inevitably some retained snags will likely be removed by fuelwood harvesters. However, given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, most of the fuelwood harvest should be localized to areas that are accessible, as indicated in the Siegel et al (2013) study. Baker et al (2008) found that pallid bats roosted in large trees >100 cm (about 39 inches) in diameter, and on the Eagle Lake RD the average diameter of the roost trees was 30.3 inches DBH, and the smallest diameter conifer roost tree was a 23.5 inch DBH ponderosa pine. The fuelwood diameter restrictions of 20 inches DBH on snags of commercial tree species should help retain these larger diameter trees. Thus this activity should not result in a substantial decrease in snags or potential pallid bat roost trees across all the USFS lands involved in the fire.

Alternative 1 : Summary of direct, indirect and cumulative effects, and viability determination – pallid bat

The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. The design features related to snag retention and reforestation would serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area.

Due to snag habitat being considered during the planning and design of actions on USFS lands and given the proposed action and its consideration of the value of understory vegetation in its design, salvage harvest and reforestation efforts on private lands within the Eiler Fire perimeter should not represent substantive cumulative effects to this species or its habitat.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project may affect individuals of pallid bats, but is not likely to result in a trend towards federal listing or loss of species viability.

Pallid Bat

Environmental Effects: Alternative 2 – No Action

Direct, Indirect and Cumulative Effects

As discussed under Alternative 1, pallid bats have been shown to respond positively to wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013), observations of

increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. However such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would all remain unaffected in this alternative, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1, and similarly to Alternative 3.

Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities of the No Action would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, there would be a substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand

outside the Eiler Fire footprint. Depending on the severity and size of such fires, this potential could represent a benefit to this species and its habitat.

Cumulative effects of hazard tree removal within the Highway 89 corridor would be as described under Alternative 1.

Pallid Bat

Environmental Effects: Alternative 3

Direct and Indirect Effects

As discussed under Alternative 1, pallid bats have been shown to respond positively to wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013), observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities.

In this alternative, hazard trees along approximately 1,095 acres of roadside corridors that are of sawtimber size would be felled and commercially removed, and sub-merchantable trees may be piled and burned or left in place. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. Compared to Alternative 2, the felling and removing as well as potential pile burning would cause a greater disturbance to or reduction in understory vegetation due to the effects of burn piles and the creation of landings for the processing of trees for removal. However such activities would affect approximately 1,095 acres, a small proportion of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS lands, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1.

Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities of the No Action would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, a there would be a

substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Pallid bat

Environmental Effects: Alternative 3

Cumulative Effects

The activities within the Eiler Fire footprint that would represent cumulative effects to this species and its habitat include salvage and reforestation on private lands burned by the fire, removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center), and personal fuelwood harvest on USFS lands.

Private land fire salvage is ongoing at the time of this writing, and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most potential snag habitat for this species. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees of sufficient size to be provide potential roosts will likely be removed. Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are generally with tighter spacing and thus include more trees per acre, and release of planted trees from competing may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would be much less understory vegetation on private lands than on USFS lands, and thus less potential for private land to contribute to a post-fire increase in insect prey relative to USFS lands. However, due to the limited actions on USFS lands proposed under this alternative, this expected loss of roost habitat and understory vegetation on private lands would not constitute a substantive cumulative effect on USFS lands.

Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities within Alternative 3 would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, a there would be a substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All these sites are in developed locations along or within the Highway 89 corridor. Due to the developed nature of these sites, and the routine identification and removal of hazard trees, including snags and structurally defective trees, from these high-use areas, and the small acreage

involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014 after the fire, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads of both fires.

As such, fire-killed trees would be subject to removal as fuelwood if accessible. Fuelwood harvest would primarily be immediately along roads in relatively flat areas that allow off-road travel, along meadow edges or other features that allow off-road travel. Inevitably some retained snags will likely be removed by fuelwood harvesters. Due to the proposed removal of hazard trees along roads, the majority of the snags that would be accessible to woodcutters would be removed anyway by this alternative. Because most of the fuelwood harvest would be localized to areas that are accessible, and diameter restrictions would help retain the larger diameter trees, and due to the proposed removal of hazard trees along roads, this activity should not result in a substantive cumulative effect across all the USFS lands involved in the fire, especially given the limited nature of actions proposed in this alternative.

Alternative 3: Summary of direct, indirect and cumulative effects, and viability determination – pallid bat

Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS lands, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1. Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities of the No Action would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, a there would be a substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project

may affect individuals of pallid bats, but is not likely to result in a trend towards federal listing or loss of species viability.

Fringed Myotis
Existing Condition: species and habitat account

Fringed myotis individuals were trapped at several locations during bat surveys from 2001-2004 on the adjacent ELRD. Locations at which this species were recorded included sites within eastside pine forests and within mixed conifer forests. Trapping results indicate that the species was not as numerous as other species encountered, but that fringed myotis were widely distributed across the District. Based on these results, fringed myotis could be present in low numbers within the Eiler Fire area.

Where encountered on the ELRD, more individuals were trapped at sites in drier, eastside pine forests compared to mixed-conifer sites. This is consistent with the available literature, which indicates that although fringed-tailed myotis use a fairly broad range of habitats, the most common habitats are oak, pinyon, and juniper woodlands or ponderosa pine forest at middle elevations. They also appear to use deserts, grasslands, and other types of woodlands. When trying to generalize all published information, this species is mostly found in dry habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak), creating complex mosaics with ample edges and abundant snags (Keinath 2004).

Although historically considered a bat that roosts in caves and buildings, Rabe and Morrell (1998) and Weller and Zabel (2001) have documented use of tree roosts by this species. Rabe and Morrell (1998) also found roosts to be in areas of higher snag densities, and suggested that the larger snags used by bats may have been found in areas of higher snag density due to the local conditions that favored snag creation, such as beetle kill, lightning, wildfire and disease. Lacki and Baker (2007), in ponderosa pine-dominated forests in Washington and Oregon, found fringed myotis to roost predominantly in rock crevices. Snags that were used as roosts were all ponderosa pine snags.

Fringed-tailed myotis are considered to feed predominantly on beetles and moths, with other items like spiders, flies, lacewings and leafhoppers also included. Consumption of prey may be a function of prey availability more than this bat species consistently selecting one type of insect over others (Verts and Carraway 1998).

Fringed Myotis
Environmental Effects: Alternative 1 – Proposed Action
Direct and Indirect Effects

Bats, including fringed myotis, have been shown to respond positively to wildfire, including high-severity wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013),

observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags.

In the Buchalsky et al (2013) study, fringed myotis activity increased with fire severity. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities. The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. As a result, multiple design features were built into this alternative in order to balance the retention of these features while still meeting multiple-use objectives on FS lands burned by the Eiler Fire.

Proposed in this alternative are 2,567 acres of ground-based salvage, 517 acres of mechanical fuels and 3,602 acres of hand fuels treatments. In all of these treatments, totaling 6,686 acres, approximately 25 percent of each treatment type would be retained in un-harvested or untreated patches. This amounts to about 1,611 acres that would remain in its existing condition relative to snag densities, and which would provide snag roosting habitat for this species.

In addition, the proposed snag retention within the 481 acres of helicopter harvest units would retain approximately 100 square feet of snags over 10" in diameter. During the design of this project, about 549 acres of proposed helicopter units were dropped from the proposed action in order to maintain burned forest habitat. While about 5-10 percent of the proposed helicopter units, as well as some of the dropped units, totaling over 1,000 acres, would be reforested to founder stands, the remaining 90-95 percent of these areas would still provide an abundance of snags and roosting habitat for this species.

Additionally, there would be no salvage harvest within the 2,226 acres of the inventoried Roadless Area on the north side of the Thousand Lakes Wilderness, and only site-specific hazard tree elimination within the 1,730 acres that burned within the Wilderness. These 3,956 acres would provide an abundance of potential roost trees for this species. Also, an additional 1,103 acres of the fire burned in a Roadless Area on the east side of Highway 89 in a sparsely vegetated lava flow. While these acres do not represent burned forest per se, there is a scattering of fire-killed trees, and a stringer of trees along Hat Creek that flows through one of these areas, that would provide potential roost trees for this species. An additional 425 acres of sparsely forested lava flow areas exist within the body of the burn perimeter, which will be neither salvaged nor

reforested, and again will provide potential roost trees for this species. These lava flow areas total about 1,528 acres.

Thus, about 8,000 acres of fire-killed snags would remain unharvested or lightly harvested in this alternative, representing about 53 percent of the USFS lands burned by the Eiler Fire. We recognize that actions proposed in the Eiler Fire (such as commercial salvage harvests and site preparation activities) would cause a reduction in snag habitat in order to meet desired conditions and objectives within these areas. However, design features built into the proposed actions would assure that snags would be retained across a substantial area of the fire.

Of the 14,926 acres that burned on USFS lands, this alternative proposes reforestation on approximately 5,645 acres within sites prepared by salvage harvest and fuels treatments, Reforestation thus represents about 38 percent of the burn acreage, leaving most of the burned area to recover on its own. In addition, of the acres of proposed reforestation there would be about 1,056 acres planted to founders stands, in which trees would be planted in only 5 to 10 percent of the unit acres. Another 2,255 acres would be planted to cluster planting, and conventional planting includes area of wider than normal tree spacing. Cluster planting and wide-spaced conventional planting would leave larger gaps between planted trees than in traditional reforestation. This wider spacing ensures that reforestation-related activities would retain more non-coniferous vegetation within these units than would be retained by traditional reforestation techniques. In addition, planting densities would generally be lower and trees more widely spaced in areas containing black oaks, and conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than 3 feet tall. Reforestation of conifers would also not occur within 150 feet of aspen and cottonwood communities on the east, south, and west sides of the community, or 100 feet on the north side to maximize light to the stand and allow for expansion. Reforestation would also not occur within 50 feet of the meadow edge, and when along stream channels and seasonal wetlands with existing riparian communities reforestation of conifer species would not occur within 20 feet of the riparian plant community. All of these strategies to alter planting densities in or near oak, aspen, cottonwoods, meadows, stream channels and seasonal wetlands would serve to retain and promote understory vegetation. In addition, 25 percent of tractor harvested units would remain unharvested, and would also remain unforested. Given all the above, with reforestation representing about 38 percent of burned area, and the techniques of reforestation being proposed, an abundance of understory vegetation that will be promoted by the high-severity fire will be retained through time.

Together, the design features related to snag retention and reforestation will serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area. While salvage operations and removal of fire-killed trees would reduce habitat for potential prey species such as wood-boring and bark beetles, the combination of snag retention and unharvested areas, as well as the increase in understory

vegetation would still provide for greater insect prey abundance than what likely occurred pre-fire.

The primary potential for direct effects to fringed myotis is disturbance to roosting individuals during salvage operations. Fringed myotis are very sensitive to roost site disturbance (O'Farrell and Studier 1980). There is potential for the flushing of fringed myotis from roost trees as salvage operations occur adjacent to a roost snag. There may also be some potential for mortality if roosting trees are removed while bats are roosting within them, though this is unlikely for adults as sensitivity to disturbance would likely cause the bats to abandon roost sites prior to tree falling. Also, due to salvage harvest occurring in the first spring and summer following the fire, occupancy of fire-killed trees by fringed myotis may be lower than what would be expected in later years. Roost placement in snags is often behind exfoliating bark and also in crevices resulting from lightning strikes and from broken tops (Rabe and Morrell 1998, Weller and Zabel 2001). Use of fire-killed trees as roosts would thus likely increase in years post-fire as bark loosens and structural defects start to accumulate within standing snags. In addition to tree roosts, Lacki and Baker (2007) found fringed myotis in xeric regions of Oregon and Washington to commonly roost in crevices of rocks within outcrops and boulder fields. The volcanic flow areas common within the footprint of the Eiler Fire, and the large expanses of talus slopes on Burney Mountain may also provide roost habitat for this species. And, as discussed above, there will remain a large number of acres of undisturbed fire killed trees that would provide undisturbed snag habitat. Therefore, potential for direct effects of this project, while present, are likely not substantial for this species.

The 361 acres of Baker cypress treatments would occur within existing pine plantations. No mature forest occurs within these plantations, and due to the small size of the planted pines there were likely few opportunities for fringed myotis roosting structure within the plantation trees prior to the fire. Therefore, the proposed Baker cypress treatments would not substantively affect habitat for this species.

Fringed Myotis

Environmental Effects: Alternative 1 – Proposed Action

Cumulative Effects

The cumulative effects analysis area for fringed myotis for this and all alternatives was expanded from the USFS lands within the fire perimeter to the larger Eiler Fire footprint in order to consider activities on private lands burned by the Eiler Fire that are adjacent to USFS lands. The analysis area was not expanded further because, 1) no spatially-oriented standards and guidelines or LOPs are associated with this species, 2) individuals do not have defined spatial territories that can be mapped or assessed, and, 3) there are no areas adjacent to the Eiler Fire area that represent unique habitat opportunities for these species that would warrant expanding the project area to include.

The activities within the Eiler Fire footprint that would represent cumulative effects to this species and its habitat include salvage and reforestation on private lands burned by the fire, removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center), and personal fuelwood harvest on USFS lands.

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most potential snag habitat for this species. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees of sufficient size to be potential roosts will likely be removed. However, due to snag habitat being considered during the planning and design of actions on USFS lands (see discussion above in Direct and Indirect Effects), this expected loss of roost habitat should not constitute a substantive cumulative effect on USFS lands.

Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are generally with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would be much less understory vegetation on private lands than on USFS lands, and thus less potential for private land to contribute to a post-fire increase in insect prey relative to USFS lands. However, given the proposed action and its consideration of the value of understory vegetation in its design (see discussion in Direct and Indirect Effects, above), this should not represent a substantive cumulative effect for this species.

Removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center) will take place outside of this document. All of these sites are in developed locations along or within the Highway 89 corridor. Due to the developed nature of these sites, the routine identification and removal of hazard trees, including snags and structurally defective trees, from these high-use areas, and the small acreage involved, this removal of public hazard trees should not represent a substantive loss of habitat for this species.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014, including the felling and removal of oversized incense-cedar snags, the fire was signed "closed" until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, snags

retained from salvage harvest would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads of both fires.

Fuelwood harvest would primarily be immediately along roads in relatively flat areas that allow off-road travel, along user-created roads, post-harvest skid trails, meadow edges or other features that allow off-road travel. Helicopter units and portions of other units on slopes that would prevent off-road travel or would make fuelwood gathering too arduous would likely be avoided. As part of the design of this project, snag retention clumps were not placed within about 150 feet of ML2 or greater roads where snags would be considered as hazards. Thus retained snag patches would be removed from roadsides and thus less accessible. The presence of stumps along roadsides corridors may also make off road travel difficult. Due to the proposed removal of hazard trees along roads within this alternative, the majority of the snags that would be accessible to woodcutters would be removed anyway. Given the large areas of snag retention (see discussion in Direct and Indirect Effects, above), including within the Wilderness and Roadless Areas, and the presence of slopes and other features that would limit access, most of the fuelwood harvest should be localized to areas that are accessible. Weller and Zabel (2001) found that fringed myotis roosted in large trees 58.5-167 cm (about 23-66 inches) in diameter, thus the fuelwood diameter restrictions of 20 inches DBH would help retain these larger diameter snags. Therefore, this activity should not result in a substantial decrease in snags across all the USFS lands involved in the fire.

Alternative 1: Summary of direct, indirect and cumulative effects, and viability determination – fringed myotis

The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. As a result, multiple design features were built into this alternative in order to balance the retention of these features while still meeting multiple-use objectives on FS lands burned by the Eiler Fire. The design features related to snag retention and reforestation will serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area. Due to snag habitat being considered during the planning and design of actions on USFS lands and given the proposed action and its consideration of the value of understory vegetation in its design, salvage harvest and reforestation efforts on private lands within the Eiler Fire perimeter should not represent substantive cumulative effects to this species or its habitat.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project

may affect individuals of fringed myotis, but is not likely to result in a trend towards federal listing or loss of species viability.

Fringed Myotis

Environmental Effects: Alternative 2 - No Action

Direct, Indirect and Cumulative Effects

As discussed under Alternative 1, fringed myotis has been shown to respond positively to wildfire, including high-severity wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013), observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags. In the Buchalsky et al (2013) study, fringed myotis activity increased with fire severity. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities.

In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags would be subject to being removed as fuelwood by woodcutters. Due to the proposed removal of hazard trees along roads, the majority of the snags that would be accessible to woodcutters would be felled anyway by this alternative. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. However such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would all remain largely unaffected in this alternative, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1, and similarly to Alternative 3.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires

burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint. Depending on the size and severity of such a fire, this potential could be a benefit for this species.

Cumulative effects of hazard tree removal along the Highway 89 corridor would be as described under Alternative 1.

Fringed Myotis

Environmental Effects: Alternative 3

Direct and Indirect Effects

As discussed under Alternative 1, fringed myotis has been shown to respond positively to wildfire, including high-severity wildfire (Buchalsky et al 2013). As discussed by Buchalsky et al (2013), observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags. In the Buchalsky et al (2013) study, fringed myotis activity increased with fire severity. The authors suggest that an increased abundance of flying insects played an important role in the patterns they observed of increased bat activity after a mixed-severity wildfire in mixed-conifer forests of the Sierra Nevada. As a result of their findings, Buchalsky et al (2013) considered the occurrence of fire on the landscape to be an important process for the maintenance of forest bat communities.

In this alternative, hazard trees along approximately 1,095 acres of roadside corridors that are of sawtimber size would be felled and commercially removed, and sub-merchantable trees may be piled and burned or left in place. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. Compared to Alternative 2, the felling and removing, as well as potential pile burning, would cause a greater disturbance to or reduction in understory vegetation due to the effects of burn piles and the creation of landings for the processing of trees for removal. However such activities would affect approximately 1,095 acres, a small proportion of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS lands,

which would sustain these factors in greater amounts and for longer into the future than would Alternative 1.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Fringed Myotis

Environmental Effects: Alternative 3

Cumulative Effects

The activities within the Eiler Fire footprint that would represent cumulative effects to this species and its habitat include salvage and reforestation on private lands burned by the fire, removal of hazard trees (along Highway 89, within the Honn Campground and the USFS administrative site at the Hat Creek Work Center), and personal fuelwood harvest on USFS lands.

Private land fire salvage is ongoing at the time of this writing and reforestation will occur on private timberlands within the fire footprint. Due to different harvest and timber management practices on private lands as compared to USFS lands, private salvage operations are expected to remove most potential snag habitat for this species. Some fire-killed trees will inevitably be left in inaccessible areas or where trees were naturally scattered prior to the fire, but for the majority of the fire footprint on private lands, fire-killed trees of sufficient size to provide potential roosts will likely be removed. Similarly, due to different management practices, site preparation on private lands is usually more thorough than on USFS lands, tree planting schemes are generally with tighter spacing and thus include more trees per acre, and release of planted trees from competing vegetation may be more intensive than on adjacent USFS lands. As a result, within the Eiler Fire footprint there would be much less understory vegetation on private lands than on USFS lands, and thus less potential for private land to contribute to a post-fire increase in insect prey relative to USFS lands. However, due to the limited actions on USFS lands proposed under this alternative, this expected loss of roost habitat and understory vegetation on private lands would not constitute a substantive cumulative effect on USFS lands.

Removal of hazard trees along the Highway 89 corridor would be as described under Alternative 1.

Personal fuelwood harvest would occur within the Eiler footprint on USFS lands. The Lassen NF has one of the most active fuelwood programs in the region, selling over 16,000 cord permits in 2011. This program allows the felling of snags by woodcutters, with upper diameter limits set at 20 inches DBH for snags of commercial species of conifers, and with no diameter restrictions on lodgepole pine snags. Woodcutters are allowed to drive off road to access snags. Due to woodcutting activity in the fall of 2014, including the felling and removal of oversized incense-cedar snags, the fire was signed “closed” until salvage operations were completed. Fuelwood gathering would again be permitted after salvage operations are complete. As such, fire-killed

trees would be subject to removal as fuelwood if accessible. Siegel et al (2013) in their monitoring of black-backed woodpeckers in the Peterson and Wheeler fires on the Lassen and Plumas NFs, respectively, noted woodcutting to be pervasive along roads of both fires.

Fuelwood harvest would primarily be immediately along roads in relatively flat areas that allow off-road travel, along meadow edges or other features that allow off-road travel. Inevitably some retained snags will likely be removed by fuelwood harvesters. However, most of the fuelwood harvest should be localized to areas that are accessible, diameter restrictions would help retain the larger diameter trees, and due to the proposed removal of hazard trees along roads, the majority of the snags that would be accessible to woodcutters would be removed anyway by this alternative. Thus this activity should not result in a substantive cumulative effect across all the USFS lands involved in the fire, especially given the limited nature of actions proposed in this alternative.

Alternative 3: Summary of direct, indirect and cumulative effects, and viability determination – fringed myotis

Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS lands, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1. No substantive cumulative effects were identified.

Given the above analyses of direct, indirect and cumulative effects, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project may affect individuals of fringed myotis, but is not likely to result in a trend towards federal listing or loss of species viability.

Western Bumble Bee

Existing Condition: species and habitat account

Bumble bee surveys were conducted on the adjacent Eagle Lake RD in 2013 and 2014. Western bumble bees were located within 24 sites during this survey effort. None of the western bumble bees were found on invasive plant species; all individuals were located on the flowers of native species. Based on these survey results, potential habitat for this species would occur within the Eiler Fire, especially within or near wet meadows, riparian areas, springs or other areas that provide a diversity of flowering plants during the summer season.

The western bumble bee has experienced severe declines in distribution and abundance due primarily to disease and other factors including loss of genetic diversity, habitat loss and fragmentation (Tommasi et al. 2004, Cameron et al. 2011, Koch et al. 2012). Bumble bees brought from Europe for commercial pollination apparently carried a microsporidian parasite,

Nosema bombi, which has been introduced into native bumble bee populations. Highest incidences of declining western bumble bee populations are associated with highest infection rates with the *Nosema* parasite. The incidence of *Nosema* infection is significantly higher in the vicinity of greenhouses that use imported bumble bees for pollination of commercial crops (Cameron et al. 2011). Agricultural and urban development re the major threats that alter landscapes and habitat required by bumble bees.

Bumble bees feed on the nectar and pollen of flowering plants. A nearly constant supply of flowering plants is critical to colony growth and development (Koch et al 2012). Foraging activity begins in the spring and continues until individuals are largely absent by the end of September. During the season, a range of 50 to hundreds of individuals may be produced depending on the quantity and quality of flowers available. Western bumble bees have a short tongue length relative to other co-occurring bumble bee species. This limits the variety of flowers that western bumble bees are able to exploit to only flowers with short corolla lengths. Across their range, western bumble bees have been observed taking nectar from a variety of flowering plants, including *Aster* spp., *Brassica* spp., *Centaurea* spp., *Cimicifuga arizonica, Corydalis caseana*, *Chrysothamnus* spp., *Cirsium* spp., *Delphinium nuttallianum, , Erythronium grandiflorum*, *Foeniculum* spp., *Geranium* spp.,, *Grindelia* spp., *Haplopappus* spp., *Hypochoeris* spp., *Ipomopsis aggregata*, *Lathyrus* spp., *Linaria vulgaris*, *Lotus* spp., *Lupinus monticola*, *Mentha* spp., *Medicago* spp., *Melilotus* spp., *Mertensia ciliata*, *Monardella* spp., *Nama* spp., *Orthocarpus* spp., *Pedicularis groenlandica, Penstemon procerus*, *Phacelia* spp., *Prunus* spp., *Raphanus* spp., *Rhododendron* spp., *Salix* spp., *Salvia* spp., *Solidago* spp., *Symphoricarpos* spp., *Tanacetum* spp., *Taraxacum* spp., *Trifolium dasyphyllum, Trichostema* spp., and *Trifolium* spp. (Evans et al. 2008).

Western Bumble Bee

Environmental Effects: Alternative 1 – Proposed Action

Direct and Indirect Effects

Generally, management actions or events that increase the diversity and abundance of flowering plants on the landscape would tend to benefit western bumble bees and other pollinator species. The Eiler Fire, by causing widespread mortality to forested stands and thus increasing understory vegetation on 14,926 acres of USFS lands, will result in a greater abundance and variety of flowering plants compared to what existed prior to the fire (DellaSalla et al 2014, Swanson et al 2014). As has been found elsewhere (Bogusch et al 2015, Taylor and Catling 2011, Grundel et al 2010), this greater abundance and diversity in floral resources should benefit western bumble bees as well as other pollinator species.

Of the proposed post-fire activities, the action that would have the greatest long-term effects to western bumble bees would be reforestation activities. Due to fire salvage harvest occurring so quickly after the fire, relatively little flowering plant life would be expected to occur within

treatment units during the first spring and early summer after the fire as compared to subsequent years. There may be some disturbance to foraging individuals due to project activities, but there is likely little potential for direct mortality. Due to the highly mobile nature of this species, there would be little potential for direct effects of the proposed activities to this species.

Reforestation efforts would result in the intentional reduction of non-coniferous vegetation within the reforested areas. Of the 14,926 acres of the Eiler Fire on USFS lands, reforestation is proposed on 5,645 acres, or about 38 percent of the burned acreage on USFS lands. Reforestation would occur after salvage harvest and/or fuels treatments. Actions associated with reforestation include site preparation, planting, and post-planting release of competing vegetation.

Site preparation would include the removal of small diameter trees as biomass, mastication, felling by hand and lopping, machine- or hand-piled and burned, or broadcast burned. In units that were not salvaged harvested, approximately 25 percent of the area would be left as snag patches and would not be site-prepped and would remain unforested. All of the above activities would result in a short-term reduction in understory vegetation due to disturbance, damage or mortality from the effects of machinery, piling and burning, or broadcast burning. However, in time, understory vegetation would resprout or seed back into these sites. Reforestation itself would cause only a slight disturbance to other vegetation since it would entail the digging of small holes in which to insert seedling trees. Release of competing vegetation after the planting would cause a greater disturbance and reduction in vegetation. Such release would generally be within a several foot radius of each planted tree from which vegetation would be removed via hand-grubbing or mastication. As a result, there would be an inevitable and intentional reduction in understory plants within these areas.

Thus, site preparation and the release of planted trees would serve to reduce the amount of floral resources within reforested units. However, the proposed action recognized the value of understory vegetation that is promoted and increased by wildfire, and took this value into account when designing reforestation. For example, conventional reforestation with wide spacing, cluster planting and the establishment of founder stands were all designed to retain understory vegetation within the units planted to these methods. In addition, planting densities would generally be lower and trees more widely spaced in areas containing black oaks, and conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall. Also, reforestation of conifers would not occur within 150 feet of aspen and cottonwood communities on the east, south, and west sides of the community, or 100 feet on the north side to maximize light to the stand and allow for expansion. Reforestation would not occur within 50 feet of the meadow edge, and when along stream channels and seasonal wetlands with existing riparian communities, reforestation of conifer species would not occur within 20 feet of the riparian plant community. All of these strategies to alter planting densities in or near oak, aspen, cottonwoods, meadows, stream channels and seasonal wetlands would serve to retain and

promote understory vegetation. In addition, 25 percent of tractor harvested units would remain unharvested, and would also remain unforested.

Given all of the above, and the fact that only 38 percent of the fire area on USFS lands would be artificially reforested, the enhanced floral resources created by the Eiler Fire would be retained throughout the majority of the fire area, and the burned area would still provide an abundance of floral resources for this species after project implementation.

Western Bumble Bee

Environmental Effects: Alternative 1 – Proposed Action

Cumulative Effects

The cumulative effects analysis area for western bumble bee for this and all alternatives was expanded from the USFS lands within the fire perimeter to the larger Eiler Fire footprint in order to consider activities on private lands burned by the Eiler Fire that are adjacent to USFS lands. The analysis area was not expanded further because, 1) no spatially-oriented standards and guidelines or LOPs are associated with this species, 2) individuals do not have defined spatial territories that can be mapped or assessed, and, 3) there are no areas adjacent to the Eiler Fire area that represent unique habitat opportunities for these species that would warrant expanding the project area to include.

The 33,162 acre Eiler Fire area includes about 18,236 acres of non-USFS lands within the fire footprint, the majority of which (18,080 acres) are private timber lands. On these lands, salvage of fire-killed trees will occur and was already occurring in the fall of 2014. On private timber lands, salvage harvest is generally more thorough than on USFS lands. Reforestation of these lands is expected, which would generally use conventional means with inter-tree spacing generally tighter than what has been proposed by this project on USFS lands. In addition, private timber lands generally employ a greater array of tools in reducing competing vegetation than does the USFS, including the use of herbicides. Given more thorough salvage harvest which would result in a greater percentage of ground disturbed by machinery than on USFS lands, tighter spacing of planted trees, and potential use of herbicides to control competing vegetation, floral resources on the private lands burned by the Eiler Fire would be expected to be substantially less in both the short- and long-term than on burned USFS lands. However, because the importance of understory vegetation was considered in this proposed action, and a large component of this vegetation would be retained in both the short- and long-term (as described above under direct and indirect effects), the reductions of this vegetation on private lands within the Eiler Fire area would not represent a substantive cumulative effect for bumble bee habitat on USFS lands.

Private fuelwood harvest is an on-going and foreseeable future activity on USFS lands within the fire perimeter. The effects of this activity after or during the timeframe in which the proposed action is being implemented would not represent a substantive cumulative effect to bumble bee habitat. While there may be a minor amount of disturbance to or reduction of understory

vegetation due to fuelwood harvest as a result of off-road vehicle traffic, such disturbance or reduction would be very localized as compared to the large acreage of understory vegetation that would be present.

Alternative 1: Summary of direct, indirect and cumulative effects, and viability determination – western bumble bee

Of the proposed post-fire activities, the action that would have the greatest long-term effects to western bumble bees would be reforestation activities. However, the proposed action recognized the value of understory vegetation that is promoted and increased by wildfire, and took this value into account when designing reforestation. The reforestation strategies to alter planting densities in or near oak, aspen, cottonwoods, meadows, stream channels and seasonal wetlands would serve to retain and promote understory vegetation. In addition, 25 percent of tractor harvested units would remain unharvested, and would also remain unforested. Given all of the above, and the fact that only 38 percent of the fire area on USFS lands would be artificially reforested, the enhanced floral resources created by the Eiler Fire would be retained throughout the majority of the fire area, and the burned area would still provide an abundance of floral resources for this species after project implementation.

Because the importance of understory vegetation was considered in this proposed action, and a large component of this vegetation would be retained in both the short- and long-term, the reductions of this vegetation on private lands within the Eiler Fire area would not represent a substantive cumulative effect for bumble bee habitat on USFS lands.

Given the above analysis, it is my determination that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Restoration Project may affect individuals of western bumble bee, but is not likely to result in a trend towards federal listing or loss of species viability.

Western Bumble Bee

Environmental Effects: Alternative 2 - No Action

Direct, Indirect and Cumulative Effects

The Eiler Fire, by causing widespread mortality to forested stands, will result in a greater abundance and variety of flowering plants compared to what existed prior to the fire (DellaSalla et al 2014, Swanson et al 2014). As has been found elsewhere (Bogusch et al 2015, Taylor and Catling 2011, Grundel et al 2010), this greater abundance and diversity in floral resources should benefit this species as well as other pollinator species. The No Action would not result in reforestation or site preparation activities that would reduce this vegetation within treatment areas, and due to the lack of reforestation, the understory response in the No Action would persist within all areas of the fire for a greater duration than compared to Alternative 1.

Cumulatively, actions such as personal-use fuelwood harvest would occur in the fire area, as would the felling of fire-killed trees when considered a hazard to safety, such as along roadways.

Fuelwood gatherers may also remove logs that result from the felling of roadside hazard trees. Such actions may cause some disturbance to or reduction of non-coniferous vegetation within the fire area, but would be confined to specific sites, primarily along roadsides. Fuelwood harvest would represent a very minor component of the burned landscape within the Eiler Fire. Livestock grazing does not occur within the fire footprint and thus would not represent a cumulative effect. Cumulative effects of activities on private timber lands within the fire footprint would be as discussed under Alternative 1. There would be no substantive cumulative effects of these actions on western bumble bee habitat on USFS lands under this alternative.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint. Such fires would likely represent a benefit for this species and its habitat.

Western Bumble Bee

Environmental Effects: Alternative 3

Direct and Indirect Effects

Due to the high mobility of this species, there would be little potential for direct impact of project activities to individual bumble bees. The potential for direct and indirect effects of this alternative to western bumble bees and their habitat would be very similar to the No Action alternative. The primary difference would be that hazard trees along roads would not only be felled, as in the No Action, but would also be commercially removed under this alternative. As such, disturbance to understory vegetation would be greater along roadside corridors due to the effects of logging machinery and the need for landings at which to process the harvested trees. This harvest of hazard trees would occur on approximately 1,095 acres of the fire area, or only about 7 percent of burned USFS lands. These are the only areas in this alternative in which the felling and or harvest of fire-killed trees would take place and no reforestation would occur in this alternative. Therefore, other than the removal of felled trees and the greater disturbance associated with removal, the rest of the effects are as discussed under the No Action.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Western Bumble Bee

Environmental Effects: Alternative 3

Cumulative Effects

Personal-use fuelwood harvest would occur within the fire footprint. Because the roadside salvage would remove many of the trees that fuelwood harvesters would potentially access under the No Action, fuelwood harvest would represent less of a cumulative effect under this alternative than the No Action. However, there may still be a minor amount of disturbance to or reduction of understory vegetation due to fuelwood harvest as a result of off-road vehicle traffic. Cumulative effects of activities on private timber lands within the Eiler footprint would be as discussed within Alternative 1. There would be no substantive cumulative effects of these actions on western bumble bee habitat on USFS lands under this alternative.

Alternative 3: Summary of direct, indirect and cumulative effects, and viability determination – western bumble bee

The potential for direct and indirect effects of this alternative to western bumble bees and their habitat would be similar to Alternative 2. Other than the removal of felled trees and the greater disturbance associated with removal, the rest of the effects are as discussed under Alternative 2. The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Given the above analysis, it is my determination that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Restoration Project may affect individuals of western bumble bee, but is not likely to result in a trend towards federal listing or loss of species viability.

VI. COMPLIANCE WITH MANAGEMENT DIRECTION

All proposed projects and design standards would adhere to current standards and guidelines of the Lassen NF's LRMP, as amended.

VII. DETERMINATION

1) Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it is my determination that the action alternatives would have no effect on the following Federally Listed or Proposed threatened or endangered species or their critical habitat:

Gray wolf, Pacific fisher, northern spotted owl, valley elderberry beetle, Central Valley steelhead DPS, Central Valley chinook salmon ESU, Delta smelt, Winter-run chinook salmon ESU, California red-legged frog, Sierra Nevada yellow-legged frog, Shasta crayfish,

conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and giant garter snake.

2) Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it is my determination that the action alternatives would have no effect on the following Forest Service Sensitive species:

Northern bald eagle, California wolverine, Sierra Nevada red fox, Townsend's big-eared bat, great gray owl, willow flycatcher, greater sandhill crane, yellow rail, Shasta hesperian snail, foothill yellow-legged frog, Cascade frog, northwestern pond turtle, California floater, Great Basin rams-horn, scalloped juga, topaz juga, montane peaclam, nugget pebblesnail, black juga, kneecap lanx, Goose Lake redband trout, hardhead, Pacific lamprey, and Eagle Lake rainbow trout.

3) As discussed in the Effects section for each of the species listed below, the Proposed Action would have negligible effects for these species and their habitats. Therefore, it is my determination that Alternative 1 may affect individuals of the following FS Sensitive species, but is not likely to result in a trend towards federal listing or loss of species viability:

California spotted owl, northern goshawk, American marten, pallid bat, fringed myotis, and western bumble bee.

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Appendix 1: Figures

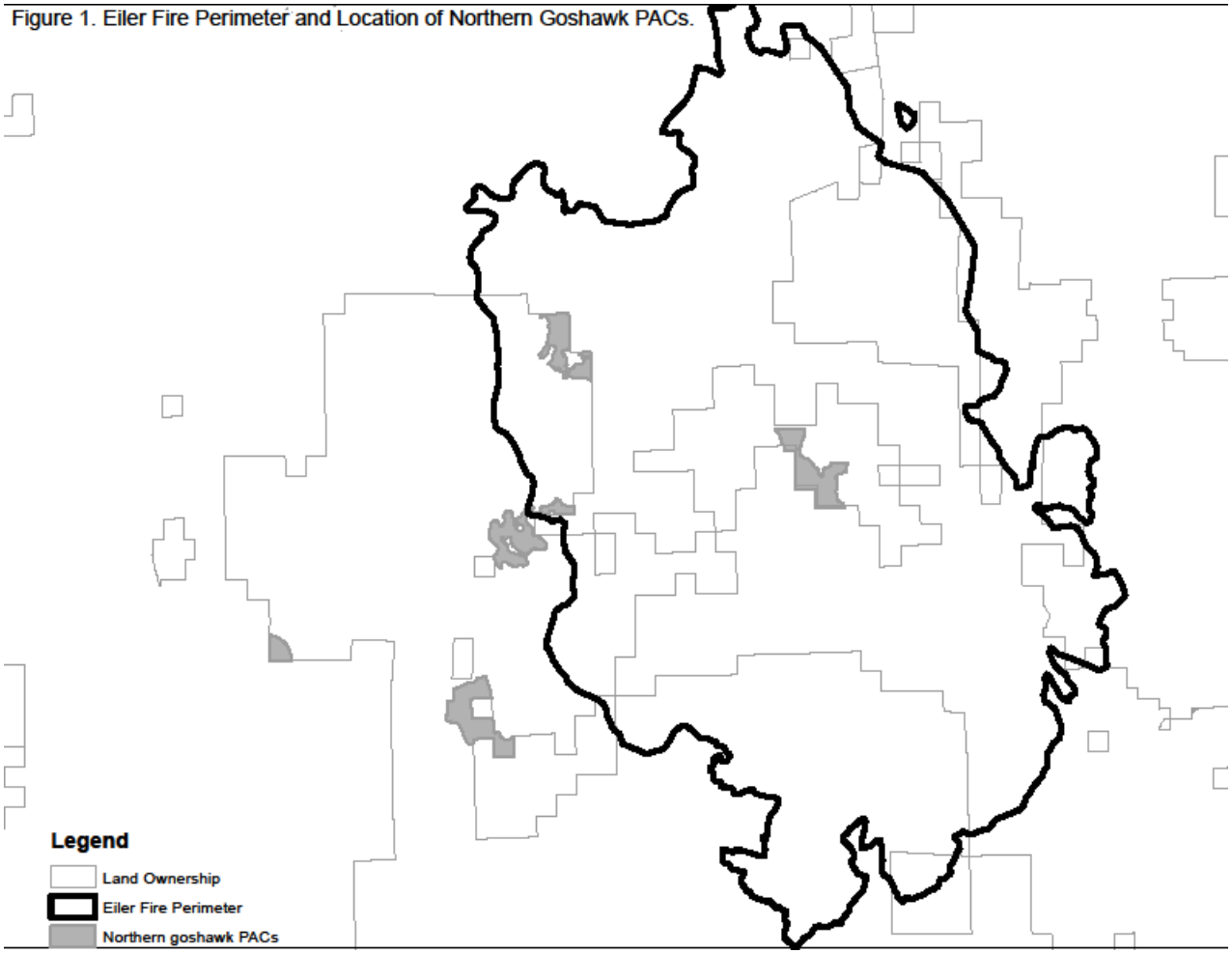

Figure 2. Eiler Fire Perimeter and Location of NCalifornia Spotted Owl PACs and HRCAs.

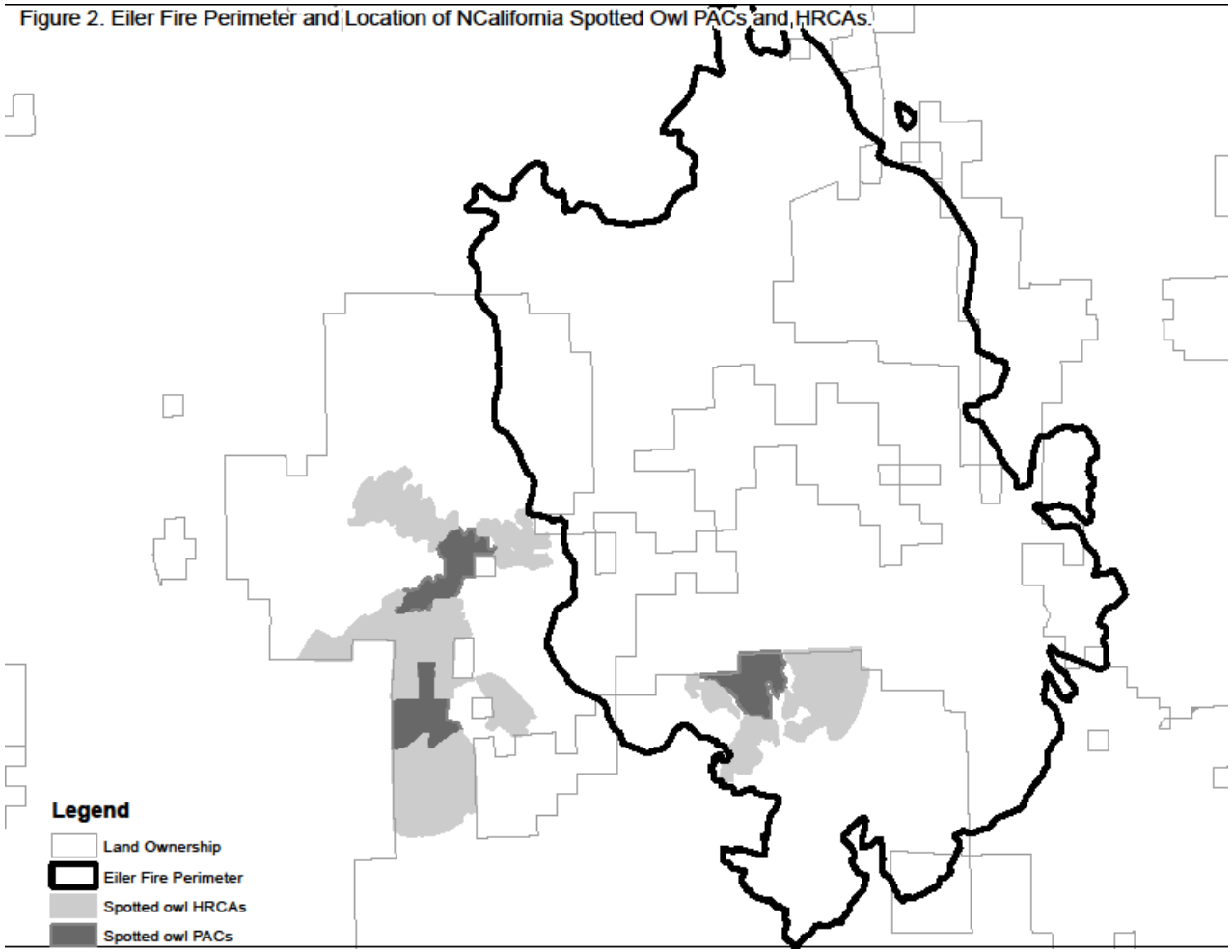

Figure 3. Eiler Fire Perimeter and Location of California spotted owl PACs, HRCAs and the Whittington Project.

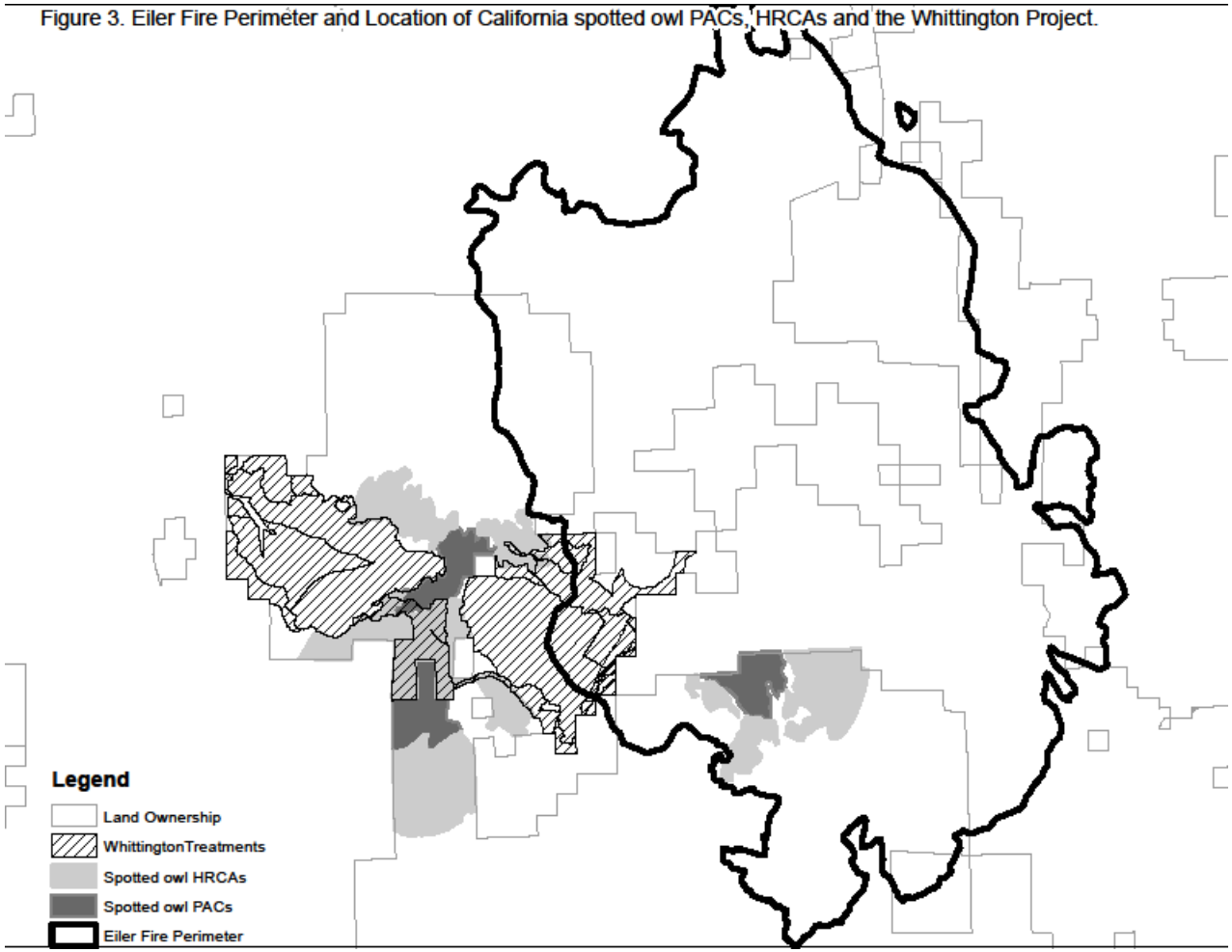

Figure 4. Eiler Fire Perimeter and Location of Marten Least Cost Pathways and LRMP-Designated Marten Areas.